VOLUME XCII
NUMBER FIVE

THE NATIONAL GEOGRAPHIC MAGAZINE

NOVEMBER, 1947

Exploring Ottawa
With 9 Illustrations BRUCE HUTCHISON
14 Natural Color Photographs JOHN E. FLETCHER

Delhi, Capital of a New Dominion
With 16 Illustrations and Map PHILLIPS TALBOT
20 Natural Color Photographs VOLKMAR WENTZEL

Yemen—Southern Arabia's Wonderland
With 18 Illustrations and Map HARLAN B. CLARK

Ancient "Skyscrapers" of Yemen
16 Natural Color Photographs RICHARD H. SANGER

Unlocking Secrets of the Northern Lights
With 39 Illustrations and Map CARL W. GARTLEIN
8 Paintings WILLIAM CROWDER

Fifty-six Pages of Illustrations in Color

PUBLISHED BY THE
NATIONAL GEOGRAPHIC SOCIETY
WASHINGTON, D. C.

$5.00 A YEAR
50c THE COPY

VOL. XCII, No. 5 WASHINGTON NOVEMBER, 1947

THE NATIONAL GEOGRAPHIC MAGAZINE

COPYRIGHT, 1947, BY NATIONAL GEOGRAPHIC SOCIETY, WASHINGTON, D. C. INTERNATIONAL COPYRIGHT SECURED

Exploring Ottawa

By Bruce Hutchison

ONCE every year, usually on a crisp January afternoon, the Gentleman Usher of the Black Rod knocks on the heavy oaken doors of the Canadian House of Commons in Ottawa.

He is a sober figure in black cocked hat and tailcoat of antique style, with rapier at side. He carries the long rod which is the symbol of his office. It will wear out in time, from long knocking on oaken panels.

The Gentleman Usher has come to inform the Commons that the Governor-General desires the attendance of "this Honorable House" in the Chamber of "the Honorable Senate" and he repeats the invitation in French. Then, after three successive low bows, he retires.

From the long central table of the Commons the Sergeant at Arms lifts the heavy mace, symbol of the people's power, and heaves its massive weight over his shoulder (Plate III). He too wears the dress and sword of another time.

Black Robes and Scarlet Tunics

The Speaker of the Commons, in three-cornered black hat and long black robe, falls in behind the mace, his robed clerks with him. In slow and solemn procession they march out of the Chamber, obeying the Governor-General's summons.

The members of the House swarm behind, talking as they go, for this is an old story with them. All along the marble corridor they pass the motionless figures of the Royal Canadian Mounted Police (mostly unmounted now) in broad cowboy hats and scarlet tunics.

Meanwhile, the Governor-General has arrived at the Senate entrance. A guard of honor is drawn up, and in this Ottawa winter the breath of the soldiers puffs up in little clouds.

The thermometer at the door probably registers zero or colder, the crowd of spectators shivers and holds its hands over its half-frozen ears, and even the policemen, who wear buffalo coats and look almost like shaggy bison, are feeling the cold today, their faces turned to purple (Color Plate I).

Above them the towers stand out strangely sharp and gaunt against the hard blue sky. The hands on the huge white face of the tower clock point to 3 p. m.

Speech from Throne Opens Parliament

The Governor-General enters the Senate Chamber and seats himself on the throne chair, his lady beside him. The Speaker of the Commons, with the members of the lower House, stands outside an elaborate wooden fence, the Bar of the Senate, at the opposite end of the Chamber.

Now the Governor-General reads the speech from the Throne (written by the Government), which is the only speech that the King or the King's representative may make in a British parliament. The Commons listens, pricking up its ears for some intimation of government policy, and, after the speech has been read again in French, it returns to work in its own Chamber (Plates IV-V).

Thus begins the annual session of the Canadian Parliament, the season of politics in a curious capital little known to the outside world. It is less known now than ever, because war completely changed the old Ottawa—changed it in tempo, in method of administration, in the daily life of politicians.

The war has changed the city physically also, crowding it with new buildings, congesting it with swarms of new workers, and ending, perhaps forever, its old leisurely and rather small-town way of life.

Canadian Army

Field Marshal Montgomery Signs Prime Minister Mackenzie King's Autograph Book

Ottawa cheered the visiting hero of El 'Alamein for having turned the war's tide in the Allies' darkest hour. Mr. Mackenzie King (left) guided his own country throughout the war. For tenure of office, few statesmen can match him. Except for brief intervals, he has been Canada's Prime Minister since 1921.

Ottawa, the capital of the United States' northern neighbor and its close military ally, is the capital of a nation in transition, and the incalculable revolution of our time is apparent in the very face of the city.

Cabinet Members Sit in Commons

An exploration of Ottawa may well begin within the Chamber of the Commons, for this is the heart not only of the capital but of the nation.

Much more than in the United States Congress, Canada's administration centers here, and here also is built, step by step, the increasing structure of co-operation between Canada and its neighbor.

The American may be surprised to find the Cabinet of Canada sitting in the Commons, a part of its membership of 245, dependent always on its confidence and support.

The desks are arranged in parallel lines, facing a central aisle (Plate II). This arrangement is an outward sign of a profound fact in the British political system—a government party to the right of the Speaker, and to the left the opposition, which is recognized as an essential part of government, as the recognized alternative to the existing ministry, ready to take office at a moment's notice.

The opposition leader, like the Prime Minister, is paid by the public treasury, as a full-time public servant, to dissect the Government's basic policies and to criticize the details of its administration.

The architecture of the Chamber shows at once the British origins of this system. The Chamber can hardly be called an imitation of the British House of Commons. It is rather an enlargement of the ancient room at Westminster which was laid in ruins by a German blitz—an enlargement and an improvement in comfort.

But this Chamber is pure Gothic in design, a huge oblong of mottled gray stone hung

AP from Press Ass'n

Prime Minister King Shows President Harry S. Truman Around Ottawa

Chimes in Peace Tower played the "Missouri Waltz" as the President visited Parliament last June 11 to address a joint session. Members gave him "three cheers and a tiger." To Canadians, a tiger is one extra, loud cheer. "Never in my life," the President said later, "have I received such a cordial reception." He remarked that Canada and the United States no longer regard each other as foreign countries but as friends.

with dark oak galleries, the woodwork carved richly like the oak of old English cathedrals. The Speaker's chair, with fretted wooden canopy, is a replica of that long used in the Mother of Parliaments. Only the golden garnishings of the ceiling break the grim beauty of this room.

Besides the physical contrast between this and the legislative chambers at Washington, there is a contrast of conventions and of tempo.

Congress meets promptly at noon. The Commons, in more leisurely fashion, takes plenty of time for lunch and does not start work until 3 o'clock, but it works usually until 11 at night.

The Commons is far more formal than the House of Representatives or the Senate—and more formal, or at least more restrained, than its ancient mother at Westminster.

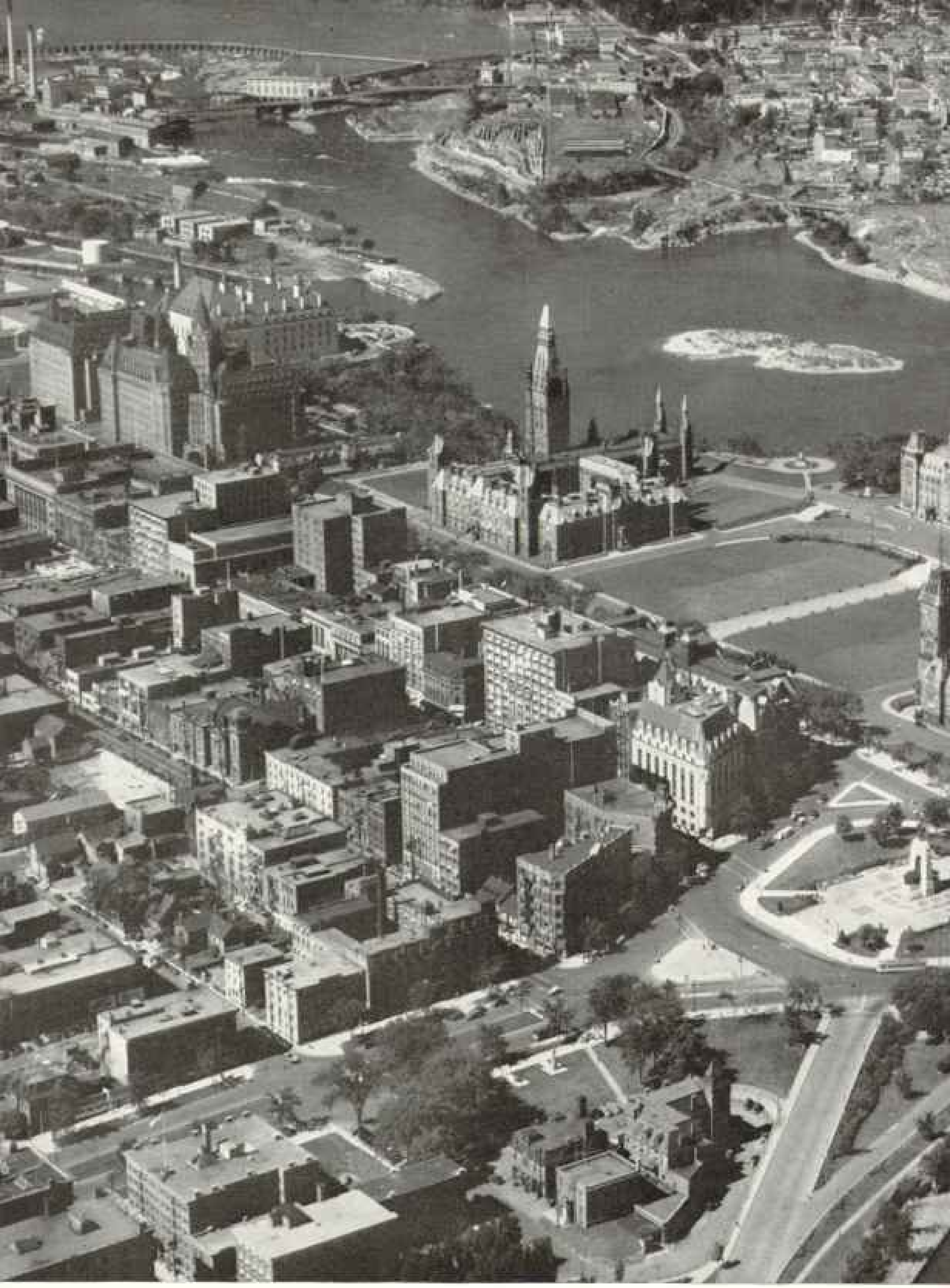
This invariably astonishes the visitor, who has found the Canadian people themselves as free and easy as their American neighbors.

The reason for Parliament's stiff decorum would be hard to find, but there are few "scenes" here, seldom an angry shout, no sensational outbursts to make copy for the long press gallery behind the Speaker's dais.

Business proceeds slowly but steadily on a fixed agenda, and the Government, being present in the House and commanding a majority of members, can concentrate discussion on its own essential legislation. The Order of the Day, the routine of the daily session, is varied only in sudden emergency.

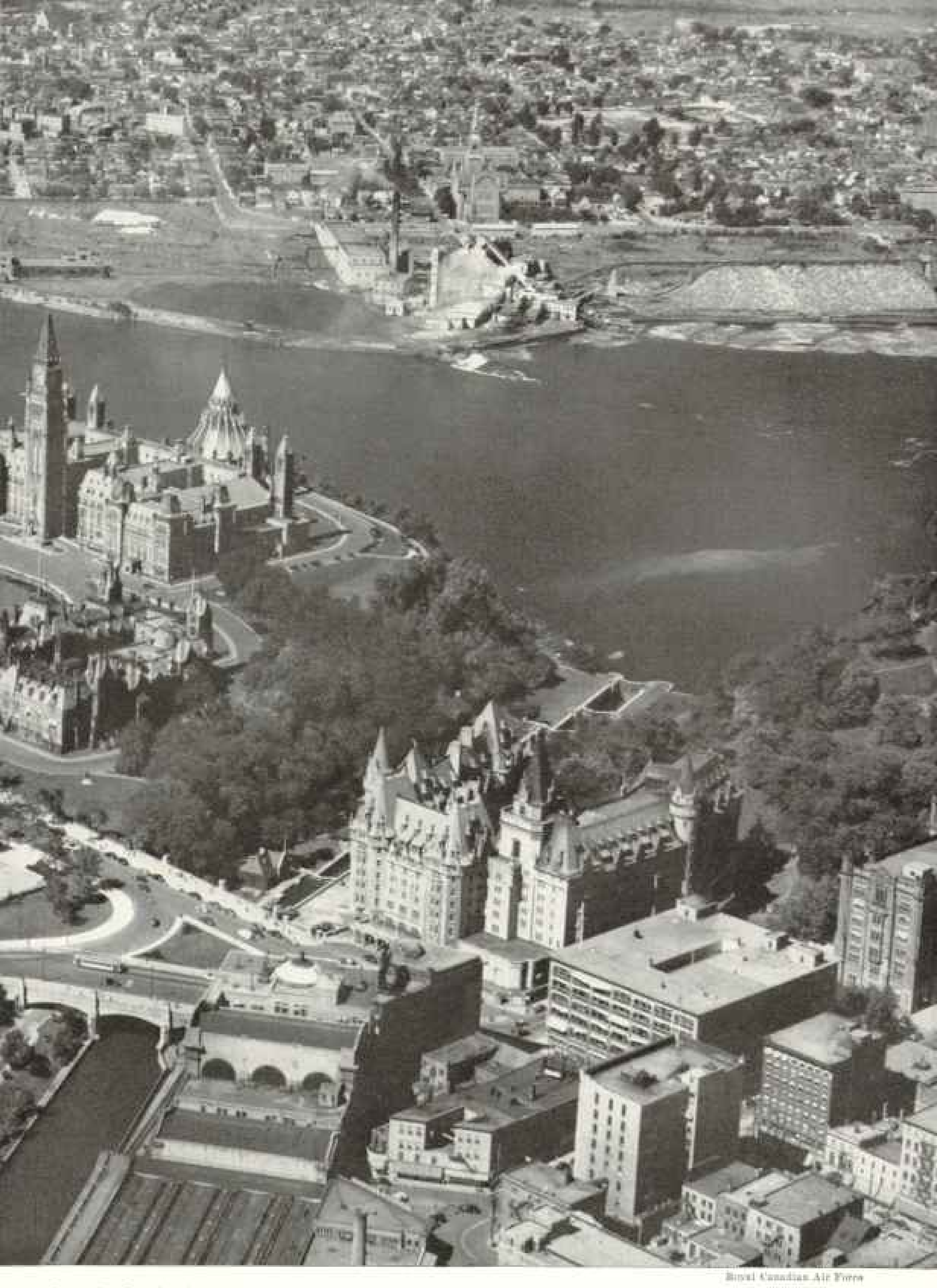
Speaker Needs No Desk or Gavel

Members are free to speak as they please, so long as they hold their speeches to forty minutes, but in all major debates the party whips, by friendly agreement, arrange the order of speeches. The Speaker commands



Its River Is to Ottawa What the Potomac Is to Washington and the Thames to London

In 1613 the French explorer Champlain voyaged up the Ottawa River; Chaudiere Falls (left) barred his way. There his Indian guides threw a tobacco offering to the *manitou*, or spirit, of the cataract. Champlain's wilderness has become a city of 165,000, where housing is desperately short (page 584). The falls yield electricity.



Royal Canadian Air Force

Ontario Looks into Quebec; Ottawa's Across-the-river Twin Is the Factory Town of Hull

Parliament meets in the Gothic pile beside the river (center). On its grounds, the East Block (right) and West Block house executive offices. Rideau Canal flows past Union Station (foreground), Château Laurier yond), and Major's Hill Park. Hull was founded around 1800 by Philemon Wright, a Massachusetts man.

absolute respect in all quarters and, if he rises to call a member to order, an instant hush falls on the House. The Speaker has never required or owned a gavel, or even a desk.

Another surprise awaits the American who is used to the more rapid pace and greater informality of Washington. In the back benches, or perhaps even in the benches of the Cabinet, a member rises and, addressing himself to "Monsieur l'Orateur," delivers a set oration in French with all the lively cadences and music of that language.

French is as legal in this Parliament as English, and all official records are printed in both languages. Nearly a third of Canada is French and follows its own French way of life within the Province of Quebec.

All the essential business of the nation comes sooner or later to the House of Commons, the executive being indivisible constitutionally from the legislative wing of government.

Perhaps the House is "voting supply to His Majesty," and the visitor, if he cares to inquire, finds that Canada has a King. He happens to live in London, but he is advised on all Canadian affairs entirely by his Canadian ministers through his representative, the Governor-General.

Constitution Is a British Statute

More curious still, the constitution of this independent Canadian nation is a statute of the British Parliament, the British North America Act, relic of the times before Canada won full independence.

Despite its formal surface, the House of Commons, when not actually at work, is a cozy and neighborly place, generally free of party bitterness between its members.

Just behind the fretted woodwork and the heavy velvet curtains on each side of the Chamber are the members' lobbies, where they retire between speeches for a smoke and a chat with their fellows.

This is the only sure sanctuary for the democratic politician within Canada. Here alone is he safe from telephones, telegrams, and impatient constituents. No one but members and accredited newspaper correspondents may enter the lobbies.

While designed to be a symbol of the nation's greatness, the building of Parliament was made for comfort and for business. There are magnificent chambers for the Speaker of the Commons, committee rooms, reading rooms, and on six floors offices for the members, for officials, for the large staff of stenographers. Every member has a comfortable office as modern as his business office at home.

Yet even here the architects have managed to maintain a certain antique look. Some of the Cabinet Ministers' suites, paneled, carved, and dominated by massive fireplaces, seem to have been taken straight out of English castles in the Elizabethan period, when the grimness of feudal times was giving way to a new age of ornament.

The architects' fancy, indeed, has strayed all over the buildings and, in the most unexpected places, bursts out in curious stone carvings, sly caricatures of departed Canadian statesmen.

"The Wholesome Sea Is at Her Gates"

Such are the working quarters of the House of Commons. They occupy only half of the building, the west end. The Senate, a legislative body in theory senior to the Commons, occupies the east end, and on either side of a line drawn down the center the Speakers of the two chambers have unchallenged jurisdiction.

The center line would be drawn—if it ever came to a question of authority in such a friendly atmosphere—down Confederation Hall from the front entrance northward.

You enter Confederation Hall through massive doors of bronze over which are carved these words: "The wholesome sea is at her gates, her gates both east and west"—a haunting phrase which reminds the Canadian of his country's vast size and loneliness.

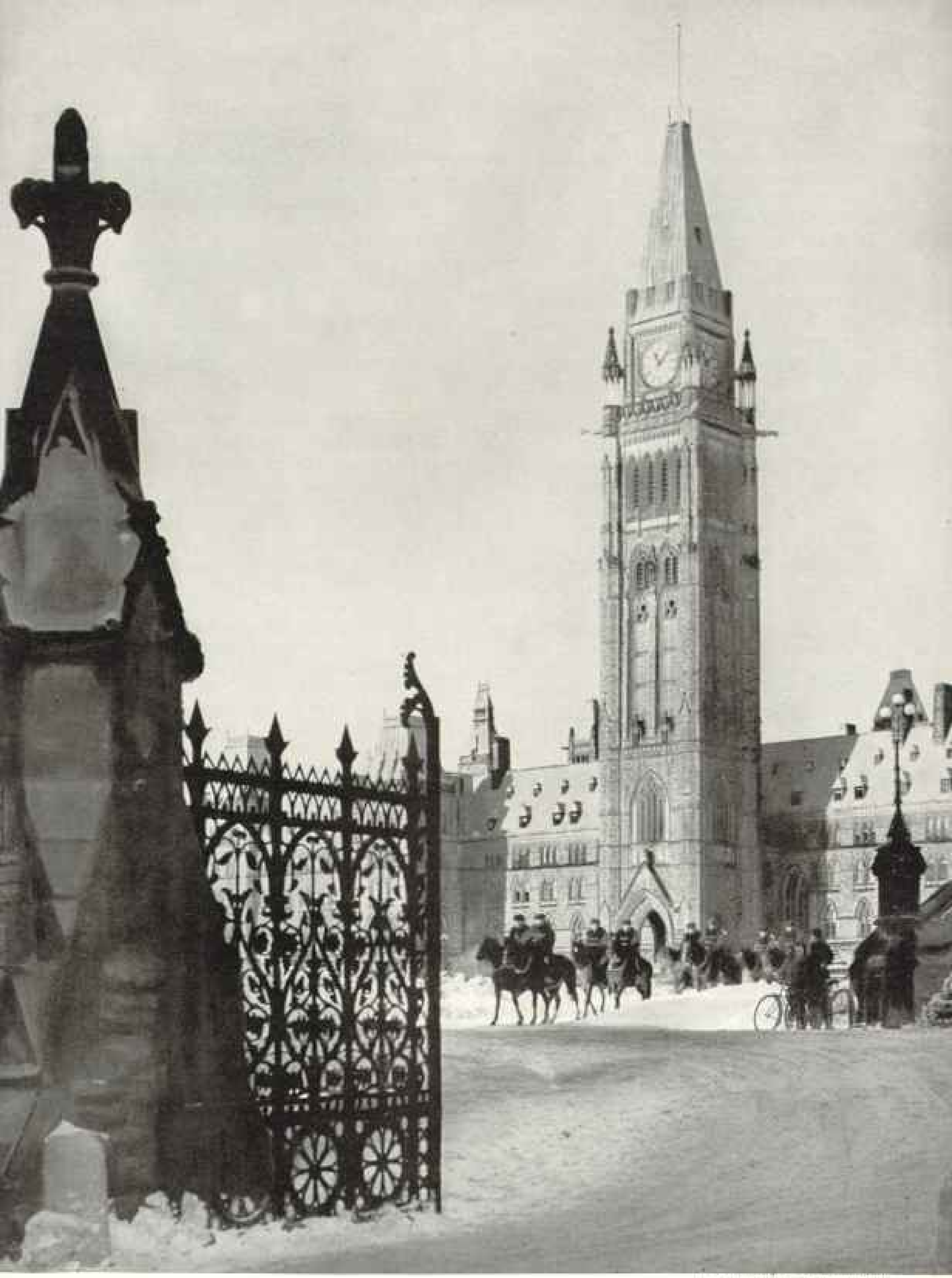
Mounting the broad marble steps, you find yourself in a circular hall of intricate and bewildering design. From its center a mighty stone pillar rises like a living tree, branching out into complicated groining to support the domed ceiling far above.

All around it other pillars of gray stone and dark marble are grouped like a little forest, their branches holding a gallery which circles the hall and seems to hide behind the foliage, only to emerge again, and again lose itself in the marvelous patterns of the stonework.

Even yet this hall is not complete. For many years, perhaps for a century or more, masons will continue to carve the big blocks of stone which have been built into the walls, the pillars, and groining to carry the final surge of ornament.

From the center of this remarkable entrance hall you look down a broad central corridor, arched and groined and flanked by many recesses which will be occupied some day by life-sized statues of great Canadians.

But at the end of this central corridor, called the Hall of Fame, the whole atmosphere changes. Crossing a threshold there,



Staff Photographer John E. Fletcher

Not All Royal Canadian Mounted Police Are Dismounted; a Few Still Ride

Time was when all Mounties had to know horseflesh. Nowadays they use motorboats, cars, motorcycles, planes. In the Far North, where a handful keep order, they must handle dogs. Behind this fur-coated, fur-capped squad patrolling Parliament Hill in Ottawa rises the Parliament Building's Peace Tower (Plate XII).

beneath a heavy stone arch, you realize that you have entered a different building, a part of the main structure and yet not part. It is the only surviving portion of the original Parliament building which was built more than 80 years ago and destroyed by fire in 1916.

Pass through the old pine doors and you find yourself in a curious, quaint, and utterly Victorian room, the Library of Parliament. It is octagonal, rather like a chapel appended to the new building, a retreat from the strife of politics, where legislators can consult every branch of knowledge and all the archives of the nation (Plate VIII).

On all sides the bookshelves rise tier on tier, jutting out into the room in strange wooden galleries and little recesses where the student can retire into the world of books.

The room is dominated by a statue of the young Queen Victoria in white marble, and around her are clustered, in a strange litter, tables of books and showcases filled with ancient documents, historical treasures of Canada which escaped the great fire.

To walk out of a Commons debate in these strenuous days and enter the Library, with its creaky wooden floors, its Victorian jimcrack galleries, wrought-iron ornaments, and friendly hush is to leave one age and find repose in another—the 19th century when Canada was a simple little country and Parliament had no larger problems than the construction of railways and the collection of taxes.

Senators Appointed for Life

To the east of the dividing line life is slower, easier, and more comfortable by far than on the west side. The Senate, which occupies its own little world, was established in the constitution to protect the rights of minorities, free from party passion, and its 96 members are appointed by the Government for life.

All the legislation of the Commons must receive the approval of the Senate, which in theory could reject any objectionable act but in practice almost never does.

The Senate Chamber in the east end perfectly reflects the largely honorary position of its occupants. It is perhaps a third the size of the Commons—a veritable jewel box of rich ornament and soft, scarlet cushioning.

Entering through the huge main doors, you are attracted first by the beautiful oaken walls, carved to the fineness of lace; then by the huge and vivid murals which picture Canada's part in the first World War, and by the sweep of the arched stone ceiling above them.

Deep in the scarlet carpet rest the desks and ample chairs of the elderly Senators, and at their head the black-robed Speaker occupies the splendid dais which is used by the Governor-General and his lady in the opening and closing of Parliament (Plates IV-V and page 582).

The Senate chairs, in any given year, are not long occupied. It is in accordance with this easy tradition and the supremacy of the elected Commons that the Senators' offices are more ornamental and luxurious than the more businesslike offices in the west wing. The pay, incidentally, is the same, $4,000 a year, plus an expense allowance of $2,000.

Canada's Most Sacred Shrine

As you return to the center of the building you may pause to inspect the most sacred spot in Canada, a little chamber in the central tower, the Peace Tower. You reach the chamber by a narrow stairway and, entering, instinctively fall silent. This is a shrine.

The genius of Gothic architecture, by which the Anglo-Saxon peoples have expressed their deepest religious feelings, has revealed in this Memorial Chamber the glory of Canada's war dead and the reverence of their countrymen.

The carved stone, which came from France and Belgium, where 60,000 Canadian boys fell in World War I, tells their story in brief, austere language, records the history of their battles, and pictures them and the faithful animals that served them.

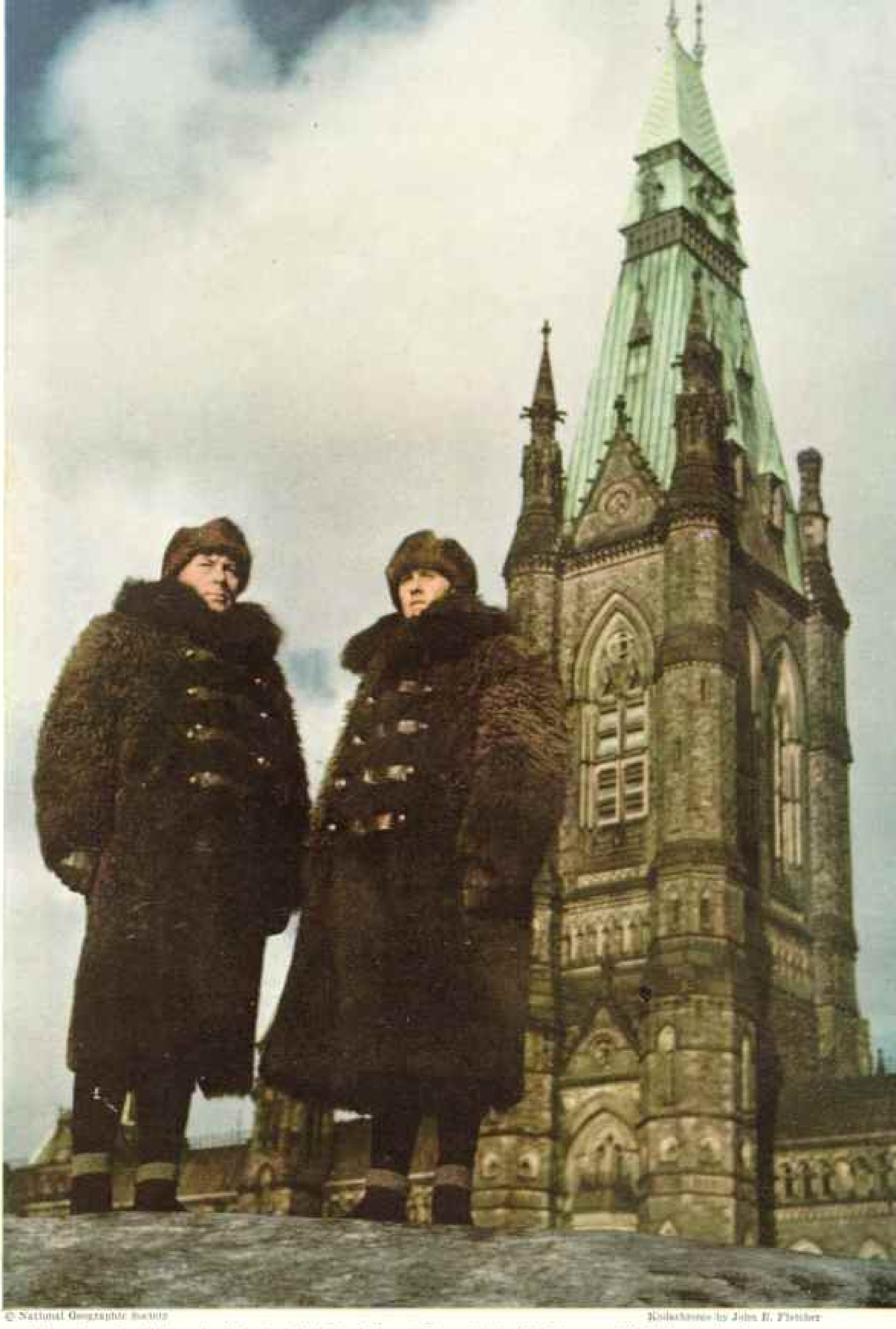
Through the superb stained-glass windows the sun slants down as in an ancient English church, throwing into bold relief the carving of the Altar of Remembrance.

On this block of English marble lies the Book of Remembrance, recording the names of the war dead for the ages. The carved walls, between soaring pillars, hold the poem, "In Flanders Fields," one of the few great literary works of the last war, written by Col. John McCrae, a Canadian whose name is inscribed in the book near by.

On the altar are carved these words from *Pilgrim's Progress:* "My marks and scars I carry with me, to be a witness for me that I have fought His battles . . ." They are carved also on the heart of Canada.

As you stand contemplating the sheer, clean beauty of this little room and perhaps pondering the tragedy of the recent war, which will add another Book of Remembrance, the bells of the carillon high above suddenly peal out with a swelling throb. It seems to shake the very stone, and it will sweep far across the countryside to be heard in remote villages and in lonely *habitant* farms.

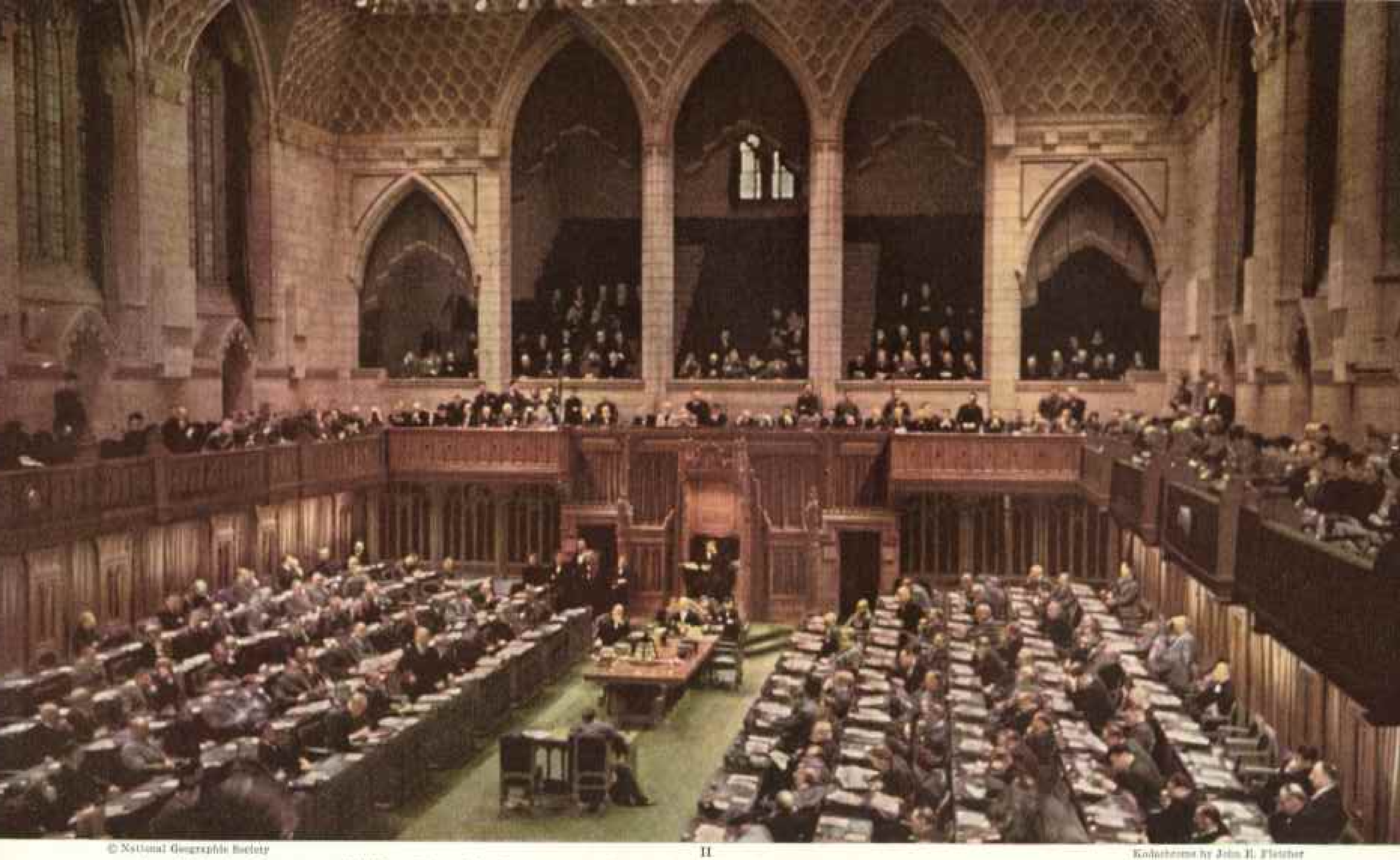
Sixty tons of bells are clanging. The largest, 100 inches in diameter, weighs more than



© National Geographic Society

Kodachrome by John E. Fletcher

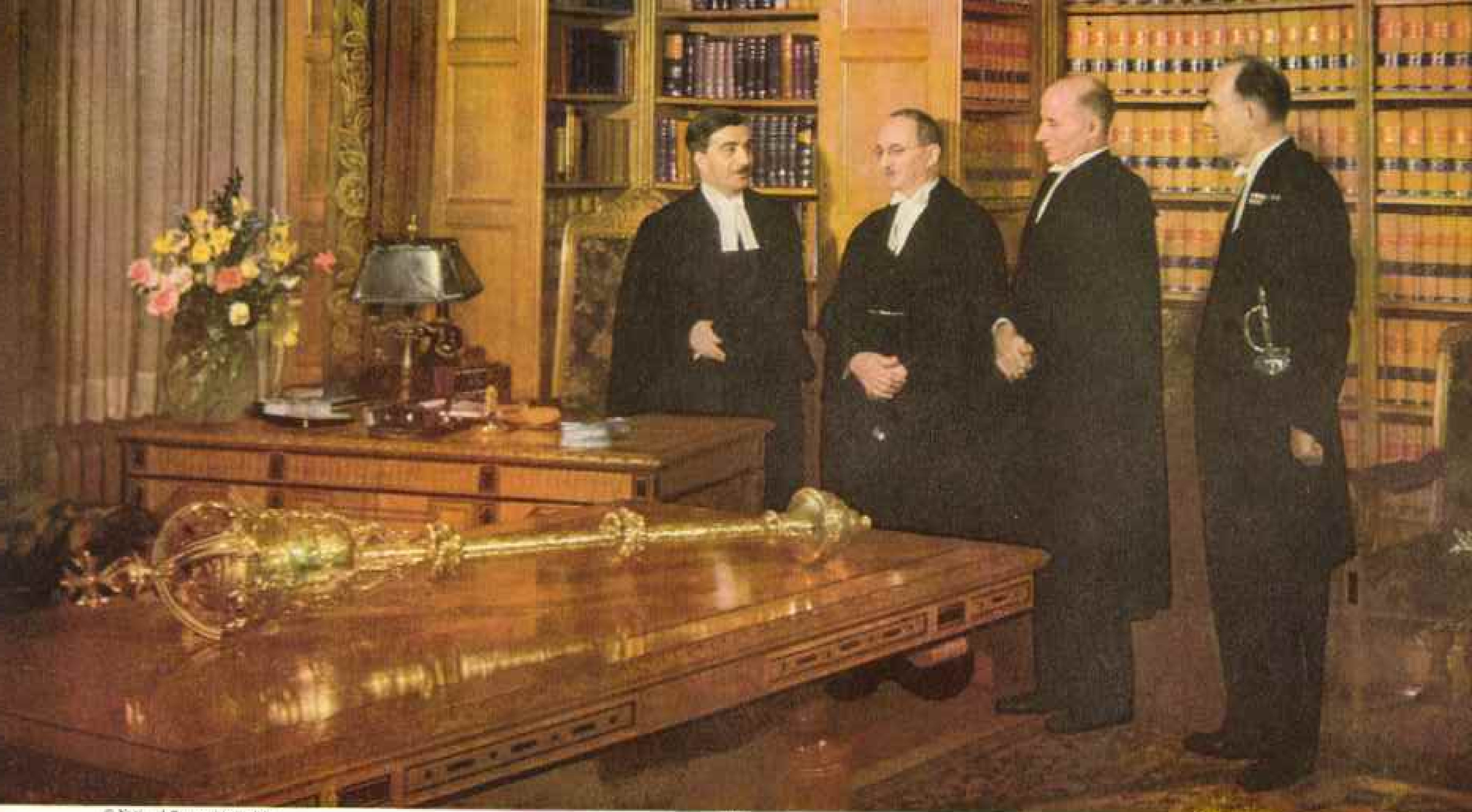
Mounties in Winter's Shaggy Buffalo Coats Guard the Parliament Buildings in Ottawa



© National Geographic Society

Kodachrome by John E. Fletcher

An Aisle in Commons Divides Canada's Government Party from Its Opposition. The Prime Minister Speaks (Front Row, Left)



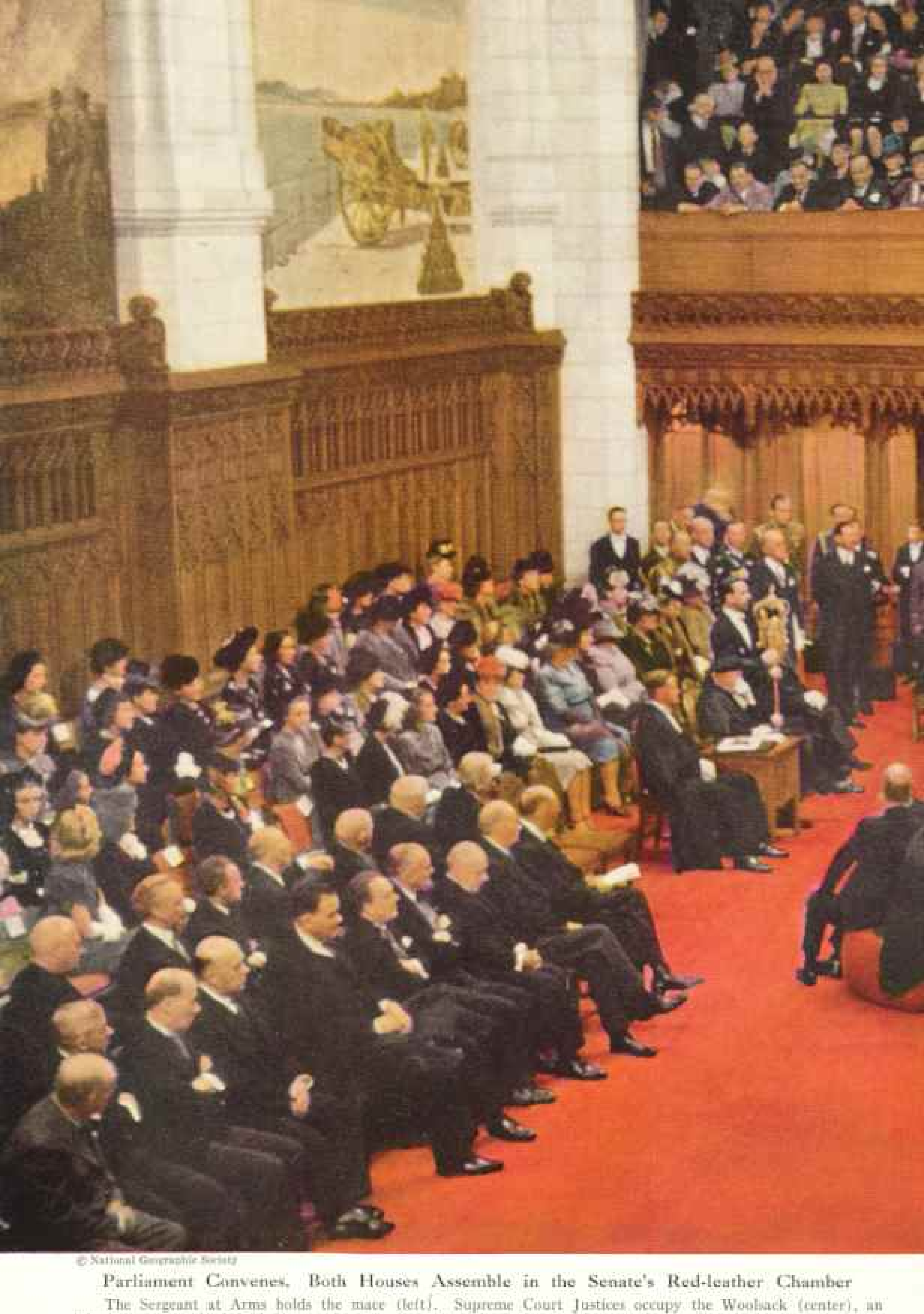
© National Geographic Society

III

Ektachrome by John E. Fletcher

Shining Symbol of the People's Authority, the Gold and Silver Mace Reposes in the Speaker's Quarters

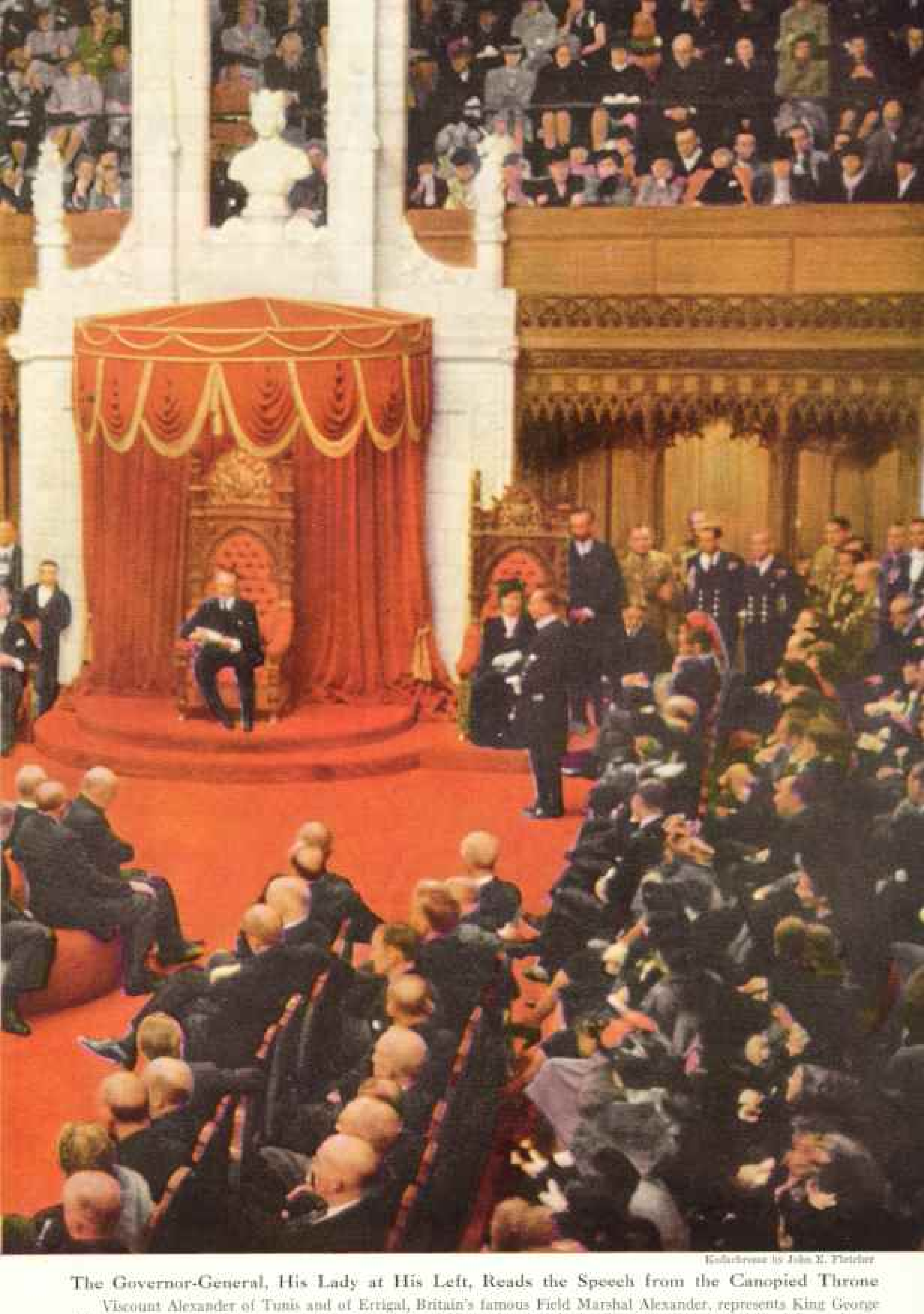
Dr. Gaspard Fauteux (left) presides over the House of Commons (in the chair, Plate II). Here he confers with his staff: Clerk of the House, Clerk Assistant, and Sergeant at Arms (sword). Dr. Fauteux represents a constituency in French-speaking Quebec. In the bilingual House he is "Mr. Speaker" or "Monsieur l'Orateur."



© National Geographic Society

Parliament Convenes, Both Houses Assemble in the Senate's Red-leather Chamber

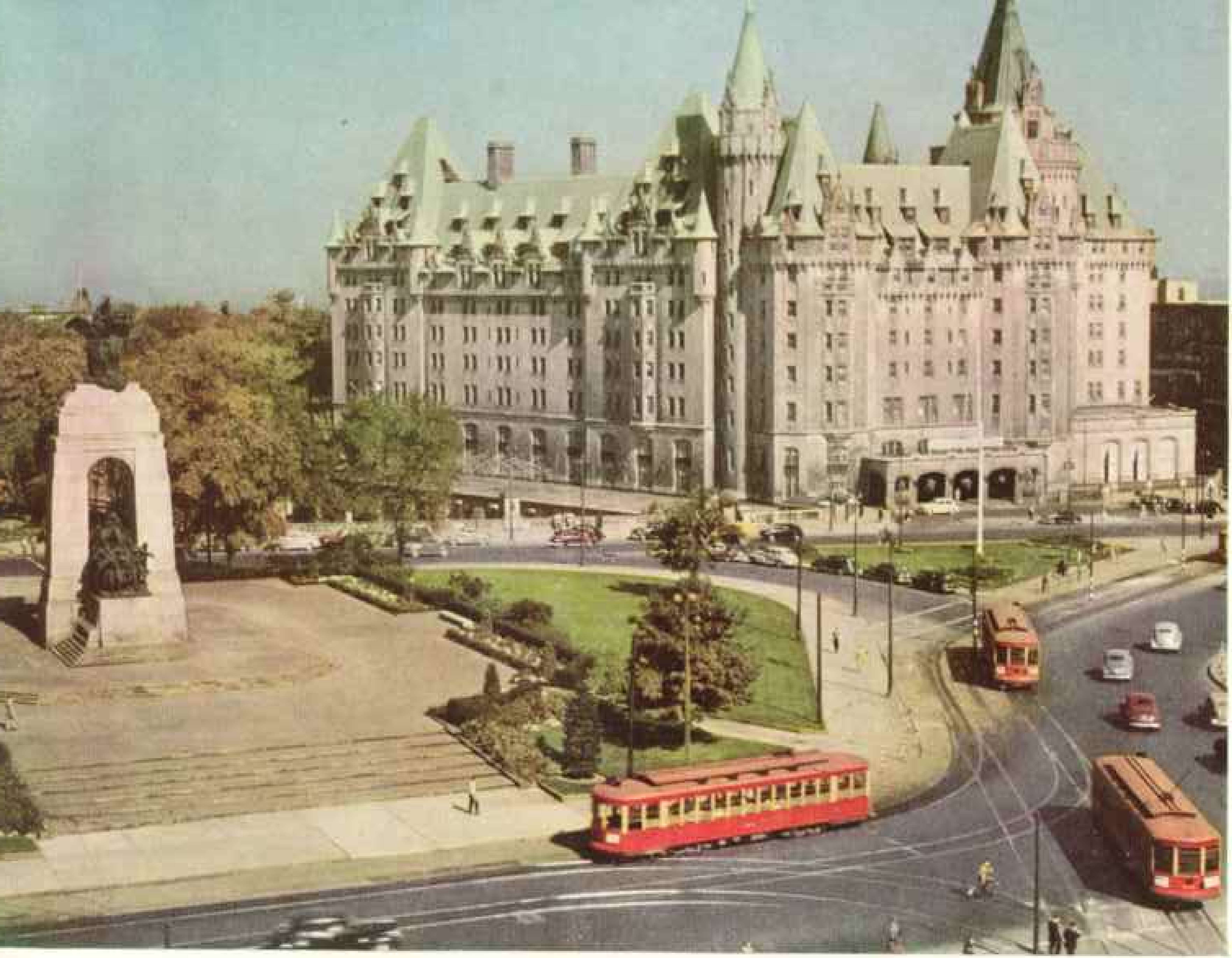
The Sergeant at Arms holds the mace (left). Supreme Court Justices occupy the Woolsack (center), an inheritance from the British House of Lords. Senators take senior positions up front. This is Ottawa's crowning annual event. Everyone wants to attend, but a gallery bench is by invitation only. At left sit members' wives.



Kodachrome by John E. Fletcher

The Governor-General, His Lady at His Left, Reads the Speech from the Canopied Throne

Viscount Alexander of Tunis and of Errigal, Britain's famous Field Marshal Alexander, represents King George VI, not the London Cabinet. The Governor-General is appointed with the Canadian Government's advice and consent. His words, nominally those of the King, actually reflect the majority party's legislative program for the session.



The Château Laurier Seems More French Château than Hotel

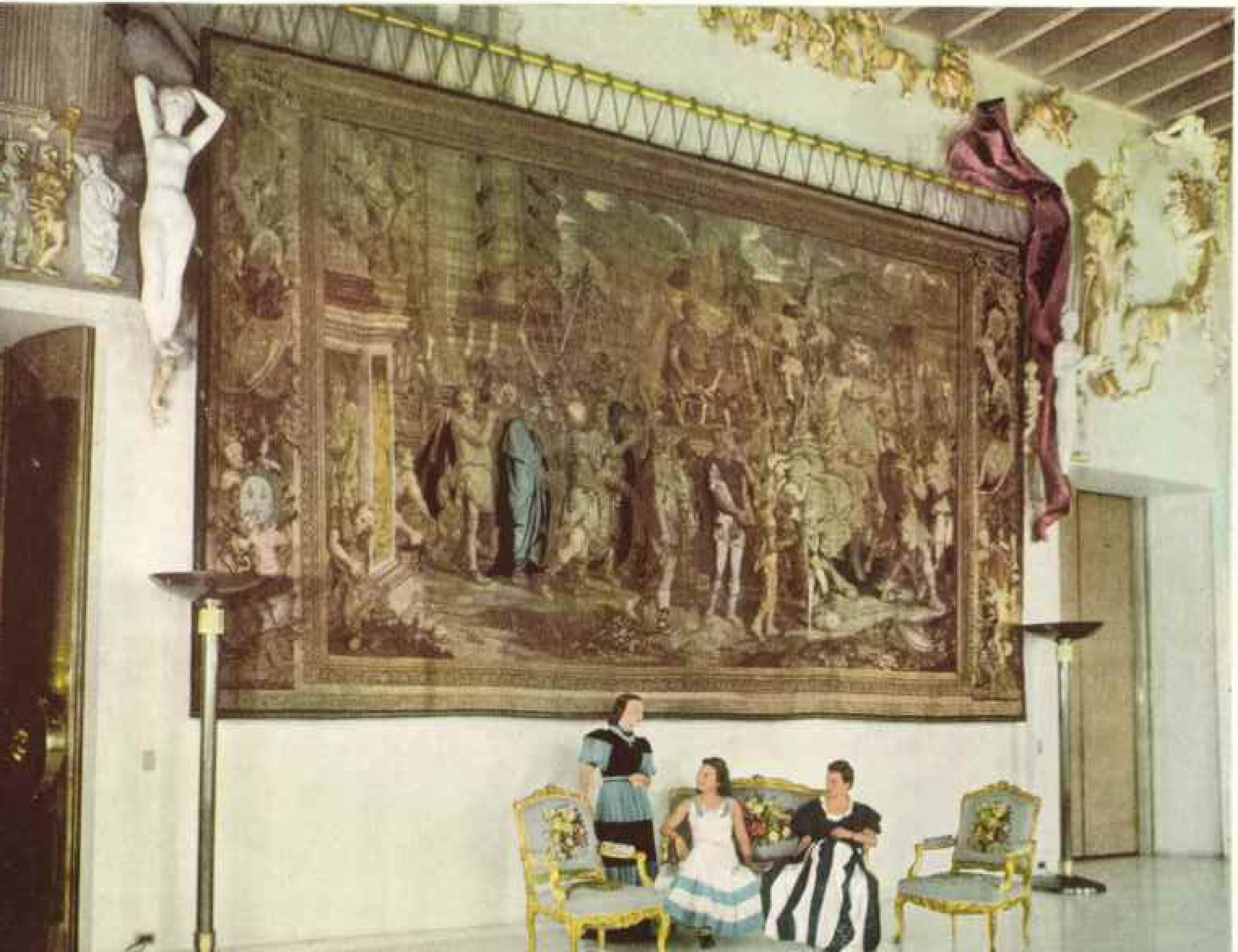
Owned by the Canadian people through their national railway system, the hotel is a center of Ottawa's political and social life. Many politicians make it their home during the parliamentary sessions. It plays host to private functions from tea parties to military balls.

The Château Laurier looks out upon Confederation Square, focal point of the city's beautification project and the starting-out place of every visitor. Ottawans call it "Confusion Circle" because streetcars and automobiles pass in opposite directions.

The white-arched monument is Canada's National War Memorial to its dead of 1914-18.

© National Geographic Society

Kodachrome by John E. Fletcher



A Gobelin Tapestry Adorns the French Embassy Ballroom

A few decades ago Great Britain had charge of Canada's foreign relations, and Ottawa had little or no diplomatic life. Now Canada, though she remains within the British Commonwealth of Nations, has gained full charge of all her own affairs. As a result, new embassies and legations have sprung up. Two of the most beautiful are the French and United States Embassies.

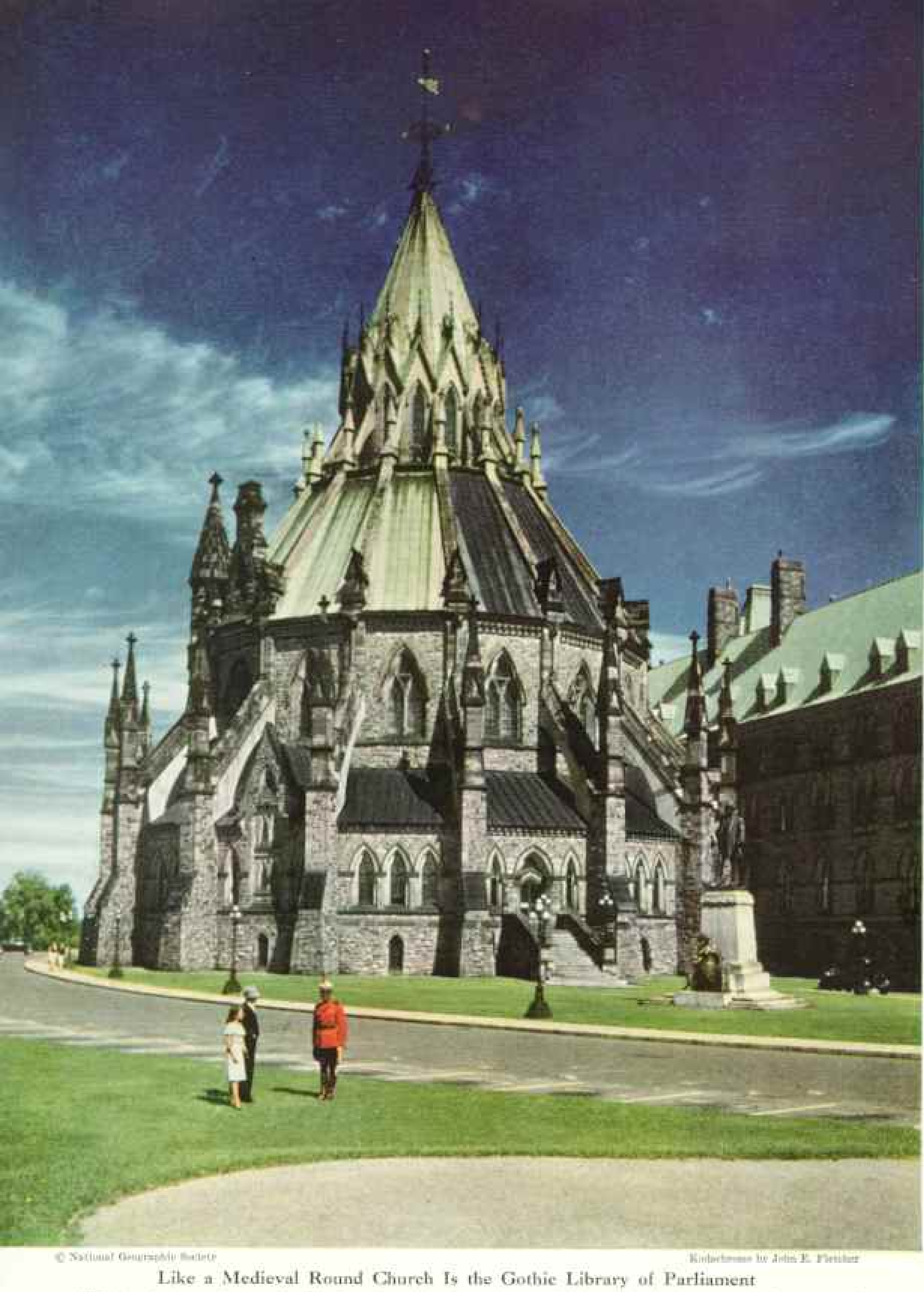
Ottawa is, in fact, taking a French beautification treatment. Jacques Greber, a French town-planning authority, has mapped a spacious city of driveways and parks.

Here a 17th-century tapestry, the "Triumph of Constantine," represents the Emperor's return to Rome after the conversion of his legions to Christianity.

Below the masterpiece are three of the seven daughters of Count Jean de Hauteclocque, the French Ambassador.

© National Geographic Society

Kodachrome by John E. Fletcher



© National Geographic Society

Kodachrome by John E. Fletcher

Like a Medieval Round Church Is the Gothic Library of Parliament

This inverted cone, festooned with pinnacles and buttresses, houses half a million books, some of them rare and costly. It is Canada's equivalent of the Library of Congress. In the fire of 1916 the library was the only part of the legislative block which was spared. It is attached to the new home of Parliament.

11 tons; the smallest, eight inches, weighs only 10 pounds. In his little room high in the tower the carillonneur is at work on his complicated keyboard, which manipulates the 53 bells as easily as the chords of a piano (page 584).

By the beauty of architecture, by the power of music, and by the memory of great deeds, the Peace Tower is set apart from the business of government, the wrangles of politics, and the evils of the world.

Parliament Hill a Noble Site

Emerging from the front door, you survey the rounded expanse of Parliament Hill. It is a natural and a noble site for a capital, this grassy bluff rising sheer beside the Ottawa River, and it has long been a landmark on the travel trails of the continent (pages 568-9).

Half a mile away the Indians, on their voyages from the interior to the lower St. Lawrence Valley, used to portage around the Chaudiere Falls. Here Champlain paused on his first voyage inland while his guides threw tobacco into the whirlpool to propitiate the gods who lived in the foaming waters.

In the summer of 1815 the Earl of Dalhousie, later Governor of Canada, stood on the river bank and, looking at the bluff on the other side, remarked to a friend: "Do not be surprised if some day you should see on yonder eminence the seat of the government of the two Canadas."

The two Canadas (now Quebec and Ontario) pursued their separate courses for a long time after that, and the bluff on the river bank remained uninhabited and unknown.

But the vast forests of the Ottawa River basin had been discovered, and presently rafts of logs were hurtling over the Chaudiere. A village sprang up farther along the stream around a little sawmill, and up and down the valley roamed the wild French-Canadian lumberjacks and rivermen.

In 1827 Col. John By arrived with a detachment of British engineers and started to build a canal from the river to Lake Ontario, so that, if Canada had to fight another war with the United States, the War of 1812 being still a vivid memory, it would be possible for gunboats and military supplies to get from Montreal to Lake Ontario without passing close to American territory.

Colonel By's canal remains, a picturesque route for canoes and motorboats, but his name no longer attaches to the river village which once bore it (Plate XV). Old Bytown became Ottawa in the middle of the last century.

The selection of the Earl of Dalhousie's "eminence" as the seat of Canadian government was almost accidental. After the Rebellion of 1837, which finally produced responsible government in Canada, riots broke out in the Canadian capital of Montreal. Lord Elgin, the Governor-General, was stoned and spattered with rotten eggs and the Parliament buildings burned. Obviously, Montreal was no place for a permanent capital.

Already the Government had shifted to and from Niagara-on-the-Lake, York (Toronto), Kingston, Montreal, and Quebec, satisfying the claims of each of the main colonial communities; but the effort of constant movement was too much. A permanent abode had to be selected.

In London the young Queen Victoria, shocked by the discontent of her colonial subjects, looked at the map of a country which she had never seen. To her it was obvious that the Canadian capital must be as distant as possible from the American border in case of future war.

After considering the claims of other places, she finally selected "a modest village town perched meekly on high bluffs and intervening valley between the spray and roar of two headlong river falls." And the prosaic name of Bytown was changed to Ottawa, a distortion of *adawe*, "to trade," a term applied to the Ottawa Indians.

In 1859 the first sod was turned on Parliament Hill, and the following year the cornerstone was laid by the Prince of Wales, who was to become King Edward VII. Young Edward had a lively time running the river rapids on a raft.

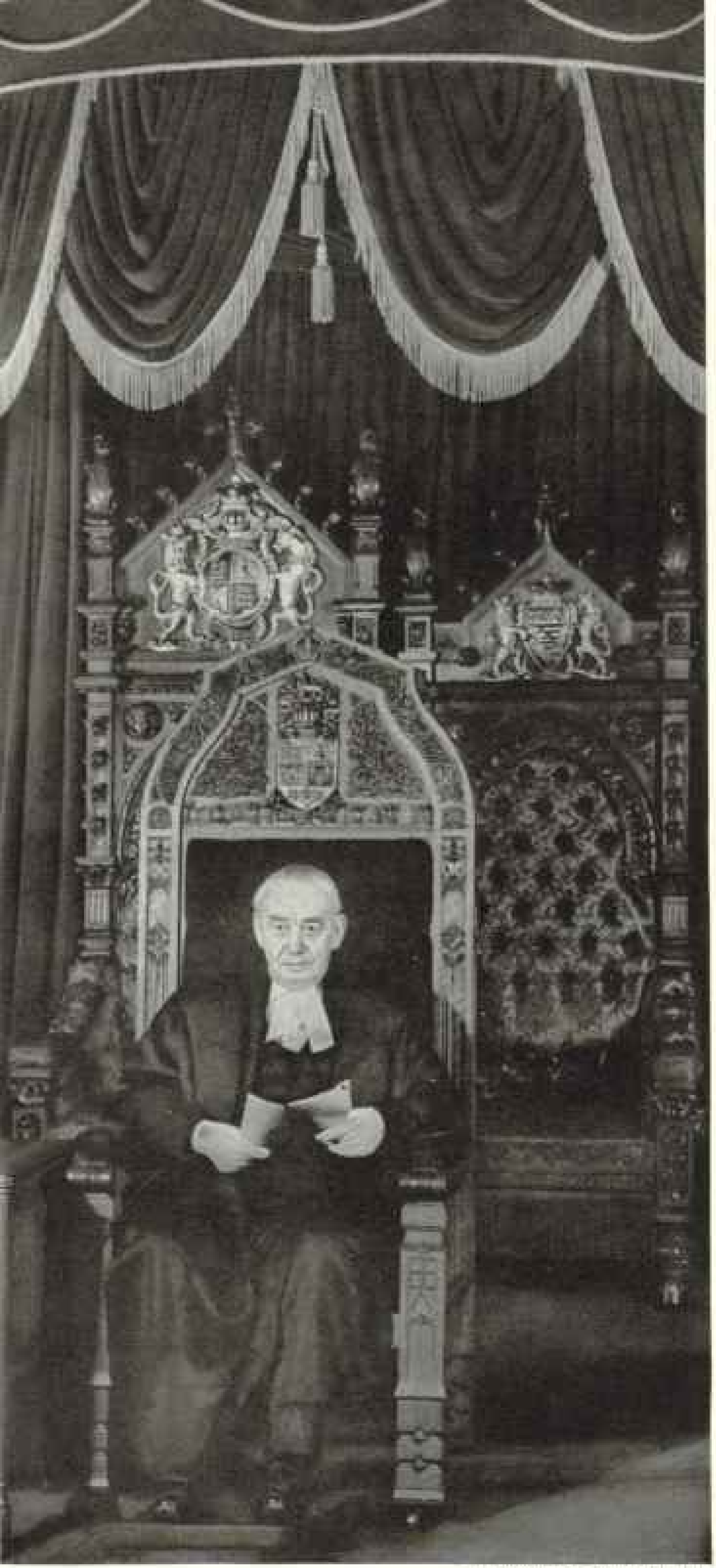
The new capital was the government seat of Upper and Lower Canada, then joined in a flimsy and unworkable union. The men who attended the first session of the joint Parliament in the new building had dreamed of a larger nation, a union of all the British colonies in North America.

In 1867 the Confederation of Canada was born, and Ottawa became the capital of a nation which soon stretched from Nova Scotia to British Columbia.

A Mighty "Finger of Stone"

The work of the original builders on Parliament Hill remains largely as they left it. In a hollow square facing a broad sweep of lawn, they reared three structures of native stone, the plain House of Parliament flanked by a many-towered office building on either side.

The office buildings remain, but the House was destroyed by the 1916 fire. It has been replaced by a larger pile of almost identical lines but entirely modern in all its appointments.



Staff Photographer John E. Fletcher

The Senate's Robed Speaker Presides in His Chair

The larger chairs are used once a year by the Governor-General and his lady in opening Parliament (Plates IV-V). The incumbent is James H. King. As a Senator, he holds a seat for life. The Canadian Senate resembles the British House of Lords more closely than it does the United States Senate (p. 572).

The new building, opened just after the first World War, is Gothic, of sheer and lean design, a huge oblong dominated by the gaunt, upthrust central mass of the Peace Tower (Plate XII).

For miles around, this mighty finger of stone, with its fretted stonework, rich carving, gaping gargoyles, and pointed steeple, is seen rising high above the surrounding trees and the city sprawled at its base. On close inspection it always reveals some new feature, a carving, an arrangement of stone, a pattern of shadows which the observer has not noticed before.

Years hence masons will still be carving new shapes of flowers, birds, and beasts into its swarming sides.

Balancing the tower at the rear of the building is the curious circular Library which escaped the fire, its tangle of flying buttresses and carved pinnacles weathered with an age and mellowness which the new building has yet to acquire (Plate VIII).

Cabinet Sits in East Block

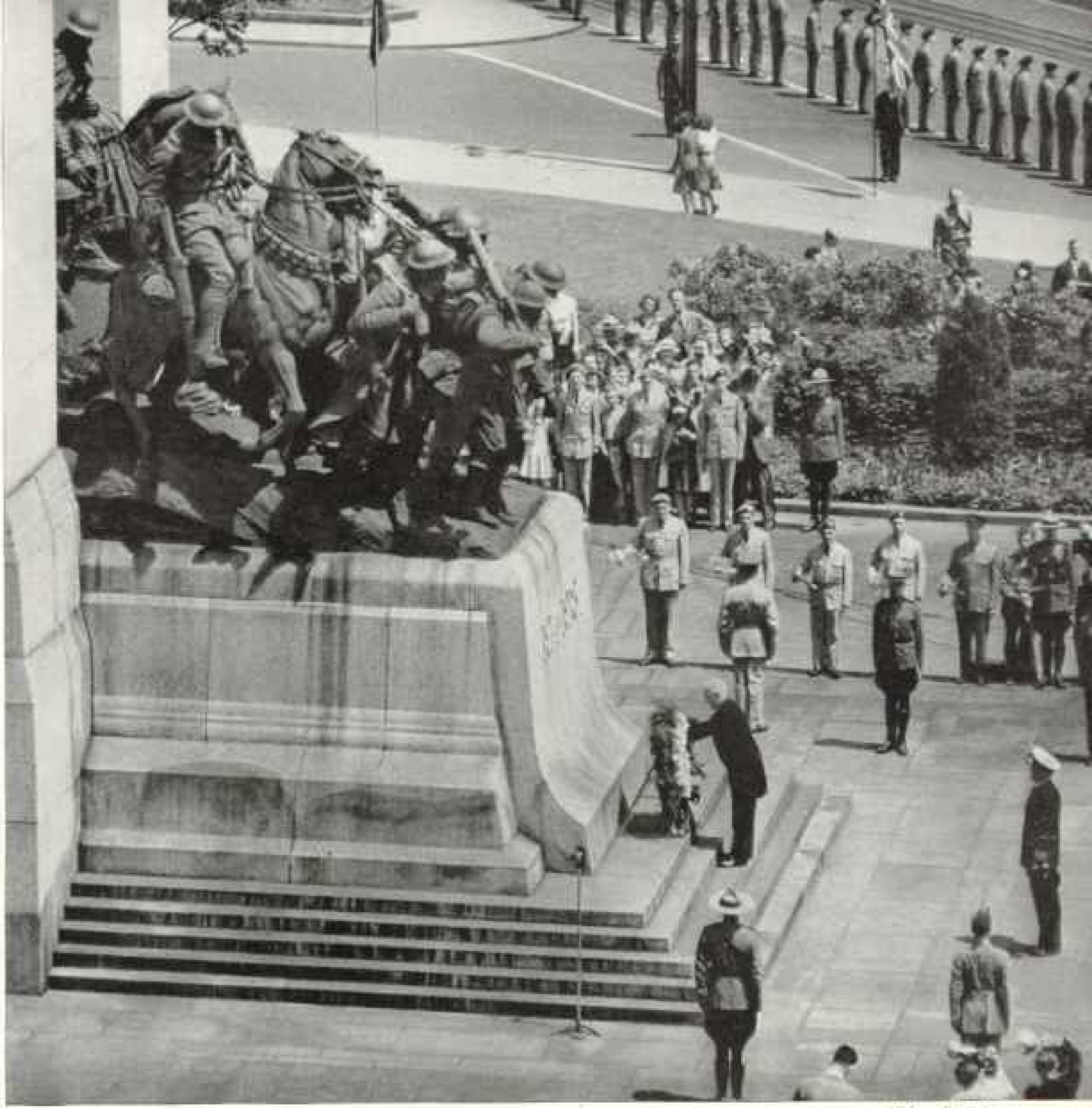
On the greensward to the east and west of the Central Block, as it is called, stand the original East and West Blocks.

Each is a jumble of towers and steeples, as if the builders had started at one end and kept on going until they were tired, but the effect is as satisfactory as the well-balanced austerity of the modern building—and perhaps a little more friendly.

The old buildings have a French feeling in their mansard roofs; yet there is perfect harmony between them and the Central Block which is so reminiscent of Westminster.

Inside the East and West Blocks there is a kind of Victorian grandeur, a 19th-century dinginess, but they are greatly loved for their memories. In them the Canadian Government has been carried on since the beginning of the nation.

In the East Block, amid stained glass and red plush, successive Cabinets have made Canada's great decisions of war and peace. Nearly every day at noon limousines draw up at the Prime Minister's entrance and the members of the Government hurry inside for the Cabinet meeting. Queen Victoria pushed the capital so far north that many of the ministers appear in caps and coats of fur.



AP from Press Ass'n

President Truman Pays a Tribute to Canada's 60,000 Warrior Dead of World War I

King George VI unveiled the National War Memorial in 1939, only a few months before Canada plunged into World War II. Bronze figures represent an artillery battery struggling through mud (Plate VI and page 587).

The massive conglomeration of stone on Parliament Hill should be seen first at a distance, from the Quebec side of the river. Half hidden among the elm and maple trees, the towers thrust through the foliage. Miles away you can hear the great clock in the Peace Tower striking, or the music of its carillon.

As you approach the Hill, the intricate pattern of the buildings looms through the trees with an ancient look, like some huge castle in the Old World. Walking up the Hill itself, you suddenly feel the full beauty of the whole design, the overpowering size and grandeur of the central tower.

Each season seems to add some special quality to the Hill. Against the steel-blue sky of the winter twilight the towers loom stark and somber, and the bronze statues of Canada's heroes stand out in dark and giant shape.

After a blizzard the buildings are caked with snow like a mighty wedding cake, huge icicles dangling from the eaves, the gray stone rimed with glistening frost.

Spring Comes to a Wintry Capital

One usually thinks of Ottawa as a winter capital, frozen and white, but in spring the Hill turns green almost overnight, and the stonework is suddenly submerged in a gush of foliage.

Staff Photographer John E. Fletcher

Ottawa's Pride, a Carillon of 53 Bells, Is Kept in Constant Repair

On summer evenings crowds gather on Parliament Hill to hear the music cascading from Peace Tower. The heaviest bell weighs 22,400 pounds; the lightest, 10 (page 572). Robert Donnell (left) is Dominion Carillonneur. For distinguished foreign visitors he plays their native music.

In summer heat the Hill dozes comfortably, old men gossip on the benches, and the sun throws rich shadows on the carved walls.

In autumn the scarlet of maple leaves sweeps up the river cliffs and around the buildings like a flame. And always there is a stern dignity, a kind of solid strength which seems to express the size, the beauty, and the loneliness of the nation around it.

The Hill is almost a little nation of its own, at once the center of Canada, the instrument of its joint will, and yet strangely apart. Like a medieval city clinging to its central castle, the modern city of Ottawa clusters around the Hill, but the stone walls and iron railings of Wellington Street mark a definite boundary between politics and ordinary life, between the heart of Canada and an Ontario city.

The business of the Hill is with the nation as a whole, and it is occupied by men from every corner of the land, who are not at home here. Ottawa outside the stone walls is a bustling community of 165,000 people busy with their own affairs.

Ottawa, Too, Grows Crowded

Of late years, however, the business of the Hill has burst all its old boundaries in a fashion to amaze the men who built the capital. Long after their time, Ottawa was a sleepy, easygoing town, free from the passions of local politics, removed from the influence of local communities, as the founders had intended.

Even when the growing population reflected the growth of the nation and the increasing importance of its government, Ottawa retained much of its old atmosphere and its slow tempo.

The depression of the thirties began to change the pace of Ottawa and also its exterior appearance. With the creation of governmental machinery to cope with the economic problem of that time, new blood was added to the civil service, new offices were opened, and new ideas began to operate in the executive and the legislature.

But this was only a minor installment in the greater changes ahead.

When war came in 1939, Ottawa found itself politically, spiritually, and physically in a state of sudden revolution. All the concentration of wartime power in the central government, all the burning energy of the Canadian people to create the nation's gigantic war program were reflected in a quick migration to the capital. The best financial, economic, industrial, and scientific brains of Canada were conscripted to manage this program.

Ottawa was no longer merely the political capital but the temporary home of business leaders, professors, scientists, and soldiers.

With their growing staffs, with some 20,000 new Government workers, they crowded the narrow business streets, they overflowed all the office space, they occupied every available house, apartment, and room. Many lived in summer cottages and ancient attics.

The Government was compelled to erect temporary office buildings of wood, incongruous in a capital of stone. Even some of the sacred squares of the city were used as sites for these war structures.

When peace came, Ottawa looked forward to an easing of the strain, but it has not yet come about.

To the old-time resident of the city, to the veteran philosophers of politics who sit glued to the leather chairs of the Rideau Club and watch Parliament across the street with general disapproval, it is becoming clear that Ottawa will never return to its old shape or its old quietude.

Government Workers Jam Streets

While the Government demobilizes the administration of war, it is establishing a huge new administration of peace. The population shows no sign of decline.

Traffic arteries were designed for a country town and cannot satisfactorily contain the movement now surging through them. During the next few years it will be necessary to perform a major surgical operation on the business district.

Plans for such reconstruction have long been designed, and a miniature model of the Ottawa of the future has been exhibited to Parliament to stimulate its interest and encourage its financial support.

Much has been done already. Looking from the Hill westward along the river cliff, you see the massive row of buildings reared in the immediate prewar years to house the growing government departments. Viewed from the opposite shore, it presents a splendid sweep of towers which might all have been built at the same time.

Unhappily, the Quebec shore does not fit into this design. The factories of Hull, the smokestacks, and the new houses offer a bleak contrast to the southern bank of the river.

Yet at night, from a high window in the Central Block, the lights of Hull and the blink of the Chaudiere power stations glistening on the river have a fairy look (pages 568-9).

Vistas of England and France

Turning now eastward, you observe from the top of the Hill a fascinating contrast of English and French feeling which vividly represents the two major peoples of the nation.

The eastern slope of the Hill, directly behind the East Block, drops suddenly in a wooded bluff to a narrow ravine. Cut into the ravine are the stone locks of the Rideau Canal, like a giant stairway.

The little stone house of the caretaker, the well-kept lawn and flower beds about it, the little boats moving lazily up and down give this spot an utterly English look.

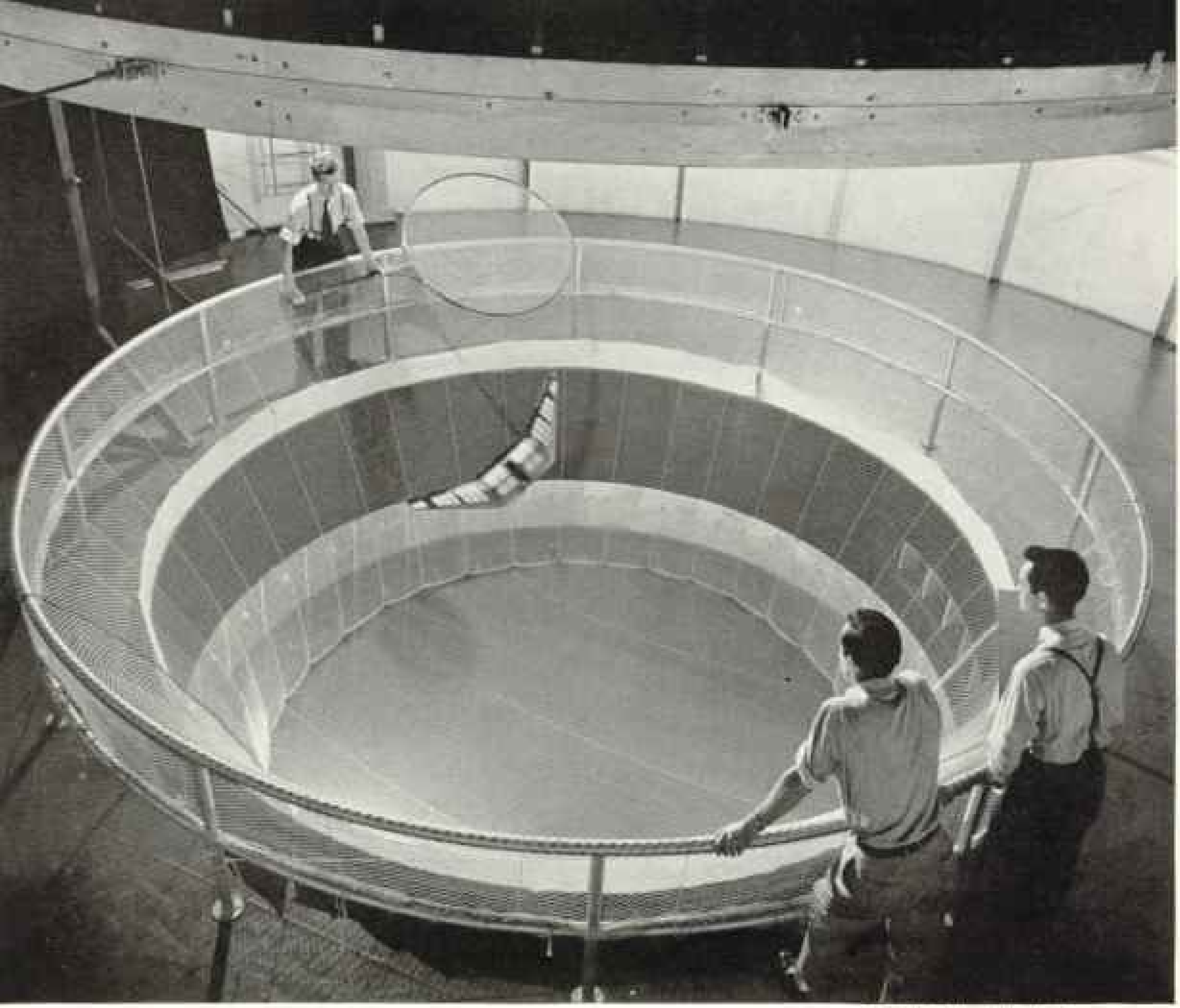
Here you might be a hundred miles away from the traffic of Wellington Street and beside some placid English stream. Col. John By's pioneer feat of engineering has no military value now, but his canal remains a quaint ornament in the heart of the capital.

Move a few yards away to the other side of the ravine and you might be in Provence.

Sheer out of the ravine rises the huge but delicate bulk of the Château Laurier. It is a modern hotel, owned by the Canadian people through their national railway system, but it could be the residence of a French aristocrat before the Revolution. Its swelling round towers and its pointed green steeples are taken straight out of France, the ancestral home of Sir Wilfrid Laurier, the Canadian statesman whose name it bears (Plate VI).

Inside the Château you will find probably the most representative cross section of modern Canadian life anywhere available.

From every part of the nation men of every sort pass through the Château lobby. The student of Canada will observe here nearly every Canadian type, from the French-Canadian farmer to the English-looking fruit grower from the Okanagan.



Canadian National Film Board

A Canadian Chasing "Butterflies" with a Net Catches Secrets of Tailless Aircraft

A scale model, released in the netting of a vertical wind tunnel, takes wing. When the wind is shut off, the technician nets the tiny plane as he would a fish brought to gaff. Tests are made in the Mechanical Engineering Laboratories of the National Research Council, Ottawa. The Council is Canada's equivalent of the United States' National Bureau of Standards.

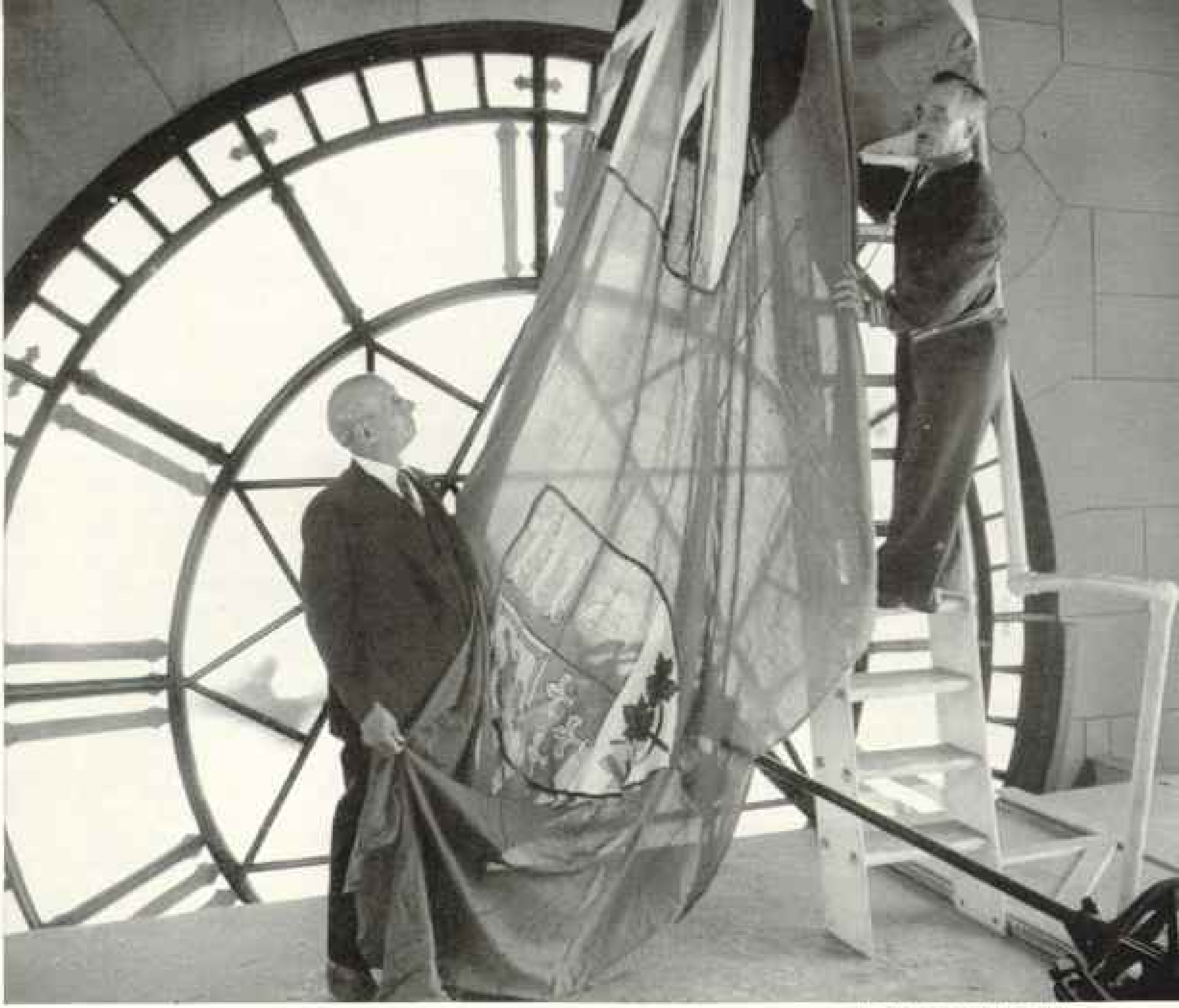
Ottawa could not have achieved its present beauty without the nation's help. Unlike Washington, which forms an area outside of any State, Ottawa is a part of Ontario, administered like other Ontario cities by an elected city council. But long ago the national government decided to assist the civic authorities, not only with money but with engineering skill. It established the Federal District Commission which represents the nation and the city jointly and which has devised a long-term scheme of beautification.

Successive prime ministers, permanent residents of Ottawa, have dreamed of the nobler capital of the future, and men like Laurier and Prime Minister Mackenzie King have taken an active part in promoting the improvement of the city.

With money from the national treasury, the whole plan of Ottawa was revised by construction of a remarkable system of driveways stretching through the city for 35 miles. Through much of this distance the driveway follows the canal and is flanked with noble boulevards and blossoming trees, so that you walk or drive as through a garden.

The numerous bridges across the canal, the slow-moving boats, the grassy banks and trees add an Old World touch, and the numerous parks which form part of the development scheme have opened Ottawa to air and sunshine. Squares and playgrounds dot residential districts, and in winter every neighborhood has its open-air skating rink for children.

Before the recent war another scheme of civic development was getting under way. To celebrate the visit of the King and Queen in 1939, Ottawa cut a splendid mall from the Hill southward and created a spacious square in the heart of the city, hard by the canal and



Staff Photographer John E. Fletcher

A Flag Going Up over Peace Tower Tells Ottawa that Parliament Is in Session

Canadians, who in 1947 became "citizens" as well as "British subjects," are to have a flag befitting their new national status. For two years Parliament has debated a suitable emblem. Meanwhile, Canada's Red Ensign, which its men followed into battle, flies from the staff.

the Château. There, it is melancholy to recall, Canada unveiled a memorial to the dead of World War I just before World War II began to call young Canadians once more to the firing line.

This memorial is a towering arch of granite, through which toil the bronze figures of a Canadian artillery battery. On a winter night, when the snow lies thick upon the figures of the memorial, they might well be living men marching through the snows of the Flanders campaign a generation ago. Around the memorial lies a stretch of grass and trees, in summer a green oasis in the swarming business district (Plate VI and page 583).

City Shows Epochs of Its History

More distinctly than in most places, because its growth has been long and steady, Ottawa shows the epochs of its history. On the river bank fine old mansions of Canada's Founding Fathers still stand, complete with stables and cast-iron lawn ornaments. Among them is "Earnscliffe," the residence of Sir John A. Macdonald, the Dominion's first Prime Minister, not far from the pretentious follies of the lumber barons who were here before Ottawa was a capital.

The center of the city is filled with the typical square brick houses of the 1890's, with the front porches, green shutters, balconies, and gingerbread ornaments of Victorian times. Victorian also in their age are the large elm trees which arch over nearly every street. These are carefully guarded and treated by crews of tree surgeons every spring, when much of the city is almost swallowed up in foliage.

Just to the south, in what used to be farm land on the edge of town, a wide band of modern homes has developed and keeps spreading outward. Even in the subzero

Ottawa winter, home building does not cease, and it has not begun to keep up with the current demand.

To the east the oldest section of the city is predominantly French. On many a street, as the neighbors sit out on the old-fashioned porches of a summer evening, you hear no word of English. Most of the French Canadians here, unlike their compatriots across the river in Quebec, are bilingual, but among themselves they do not speak English.

French also in design, with glistening silvery steeples, are the churches of the French quarter. It merges into the Sandy Hill residential district where, among other old mansions, is Laurier House, the rambling home of the Prime Minister. In its third-story study, a converted attic, the major decisions of Canadian government often are made.

Forest Preserved in Rockcliffe Park

Through the eastern half of Ottawa sweeps the Rideau River to join the Ottawa over a cataract whose beauty is not quite obscured by hydroelectrical development.

Well within the memory of most residents, the farther bank of the Rideau was in the country, and the rugged point of land called Rockcliffe, which noses out into the Ottawa, belonged to the native forest. Now it is one of the finest residential districts in Canada. With its gardens, its winding, casual streets, its hedges and stately homes, it has a strange look of England about it.

From the bluff above the river you look far up and down the water and across to the rolling hills of Quebec, where the silver spires of village churches glisten in the sun.

Much of the native forest has been preserved in Rockcliffe Park, a wild sweep of timber and grassy glens. On a sunny day in winter hundreds of skiers frolic on the hillsides and follow the trails through the woods.

Close beside the park is the official center of government in Canada, the residence of the Governor-General. His mansion, Rideau Hall, is the rebuilt home of an early millionaire.

Instead of the somewhat stuffy palace which you might expect, Rideau Hall is a huge country house, comfortable and homelike, standing in the middle of a broad sweep of lawn, garden, and virgin wilderness.

Rideau Hall maintains much of the formality and glitter of a British court. Until the war, on occasions of the highest ceremony there, civil uniform was worn, and when the Governor-General and his lady held their formal "drawing room" in the Senate Chamber, ladies who were presented were likely to wear veils, trains, and ostrich plumes.

American diplomats who come to the United States Embassy on Wellington Street directly from Washington find Ottawa a strangely quiet and rather slow-moving town.

Washington is an excitable capital, usually on edge about something, with a big news story breaking. Before the war a first-rate news story in Ottawa was relatively rare, and the whole tempo of life was more like that of an Ontario town than a national capital.

Canadians always live less tensely than their neighbors, are much less easily roused, more leisurely, and more taciturn. Their capital merely reflects a national characteristic.

Long ago this grown-up Ontario town developed a rather old-fashioned culture of its own. It has an appreciative musical community, a remarkable Little Theater movement, and societies that debate public affairs.

It is a city of open-air sport also. Across the river it maintains beautiful golf courses. Along the river bank are numerous summer communities devoted to bathing and fishing.

In December Ottawa puts on ski clothes and meets the winter boldly. Long and crowded ski trains carry hundreds of young people up into the Gatineau Hills at the week end. Vacant lots and tennis courts are flooded for skating.

Capital Reflects Growth of Nation

The logs still move down the river, as they have moved from the earliest days of the white man (Plate XIV). In the spring you can still go a few miles up the Gatineau and see maple sap boiling in the iron pots, spread it on the snow, and lick the congealed taffy off a stick.

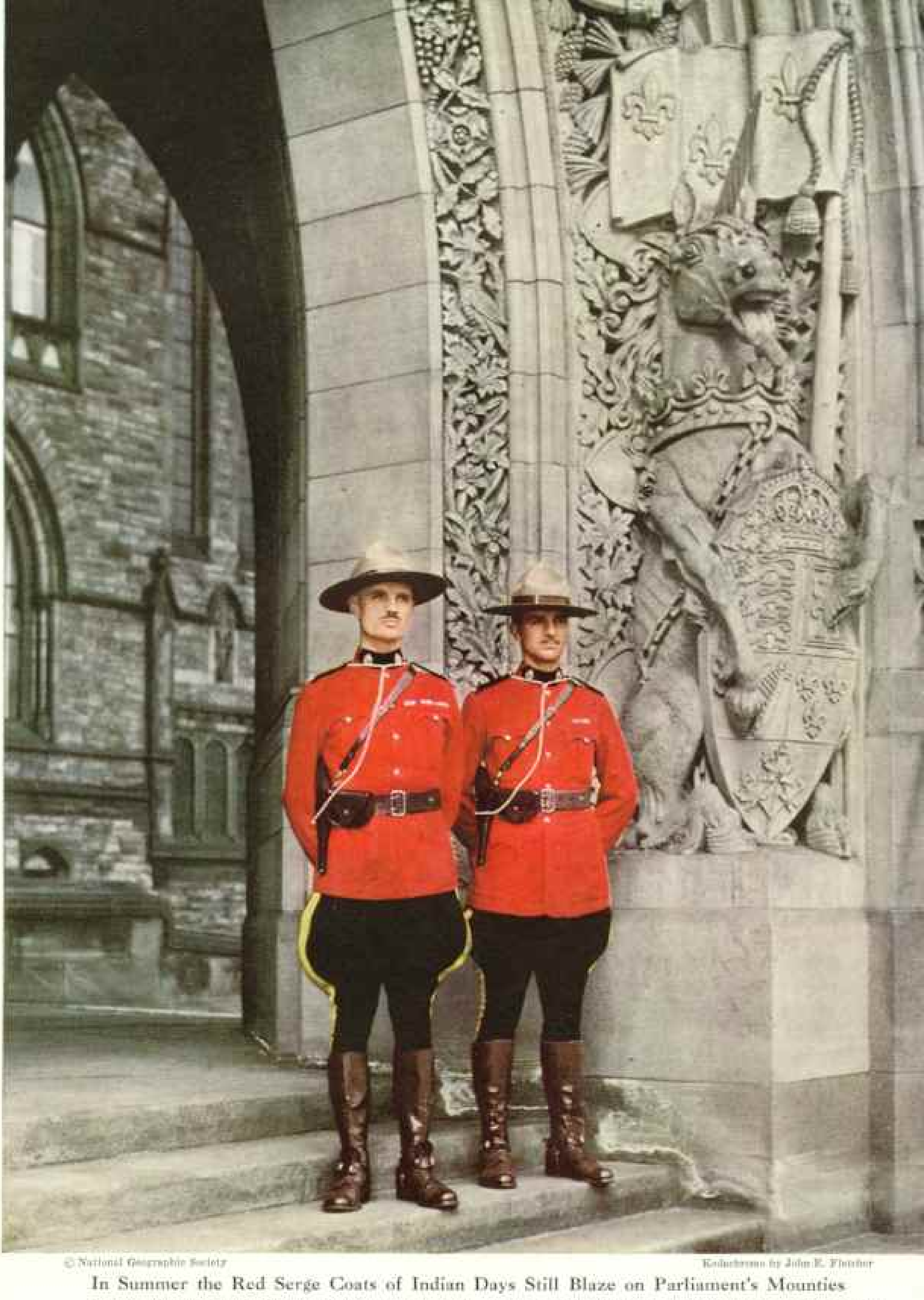
The sedate life of the old Ottawa home, the life of the Ontario town, still goes on. The gossip of the Hill still reaches the Rideau Club before it reaches the newspapers, and a few Cabinet ministers still travel on streetcars.

But prewar Ottawa has been covered over by the litter of events. The capital looks back a little wistfully to the "old days" and realizes with a start that they were only half a dozen years ago. They will never return because Ottawa, as a capital, reflects more vividly than any other city the new structure of Canada as one of the leading industrial, productive, and trading nations of the world.

Canadians discovered their own capital during the war, and now that capital, through the new channels of diplomacy, is discovering other nations. This growth of Canadian nationhood, as it continues, will always stamp itself on the outer face, as on the inner ways, of Ottawa.*

---

* See "Canada's War Effort," by Bruce Hutchison, NATIONAL GEOGRAPHIC MAGAZINE, November, 1941.



© National Geographic Society

Kodachrome by John E. Fletcher

In Summer the Red Serge Coats of Indian Days Still Blaze on Parliament's Mounties

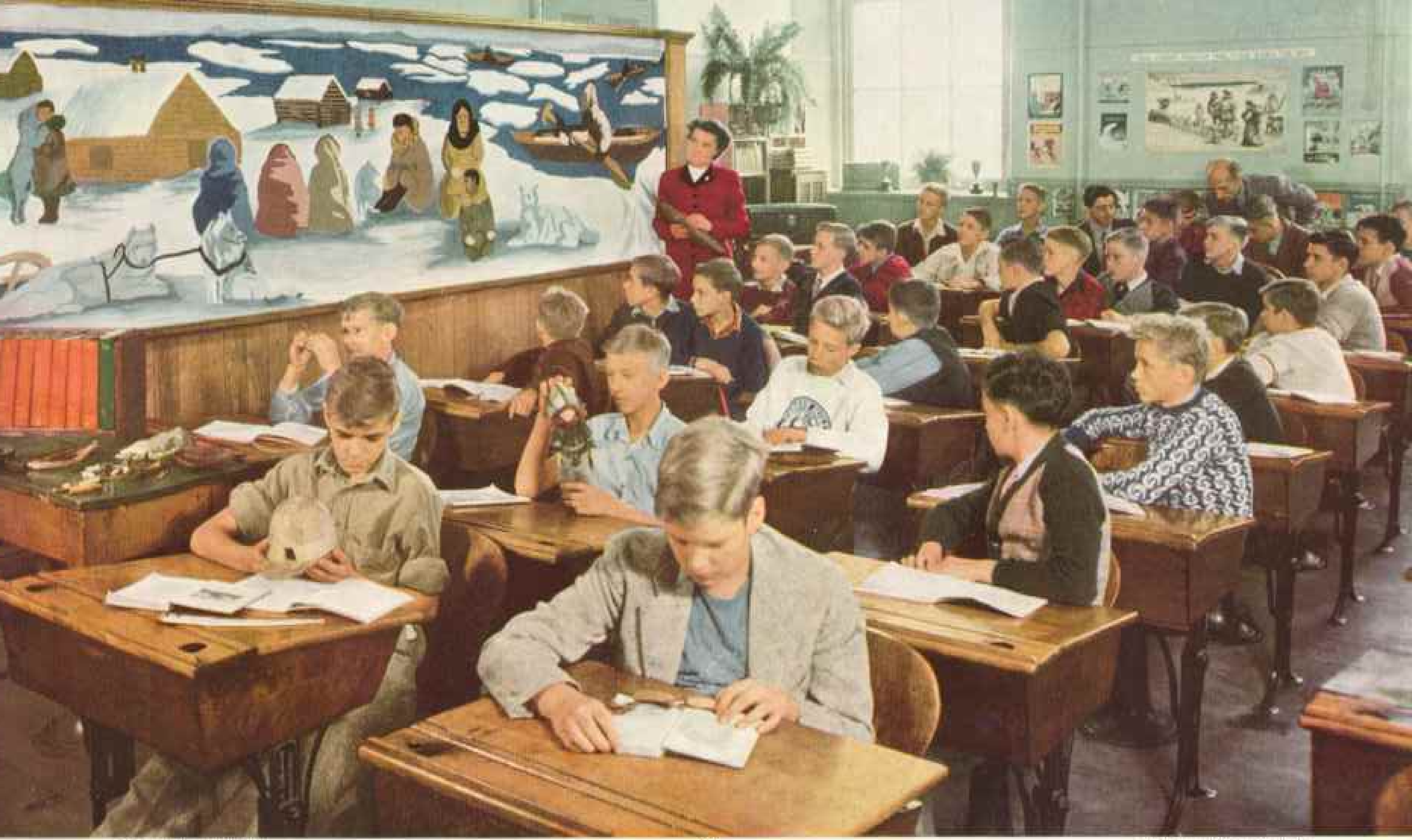
Sentries change, but the Unicorn keeps constant vigil. Heraldry yokes him to a lion on the other side of the arch. They are reminders that hundreds of gargoyles and shields have been carved on the main building. New stone faces and figures are being added constantly. Generations of carvers will be required to complete the work.

© National Geographic Society

X

Kodachrome by John E. Fletcher

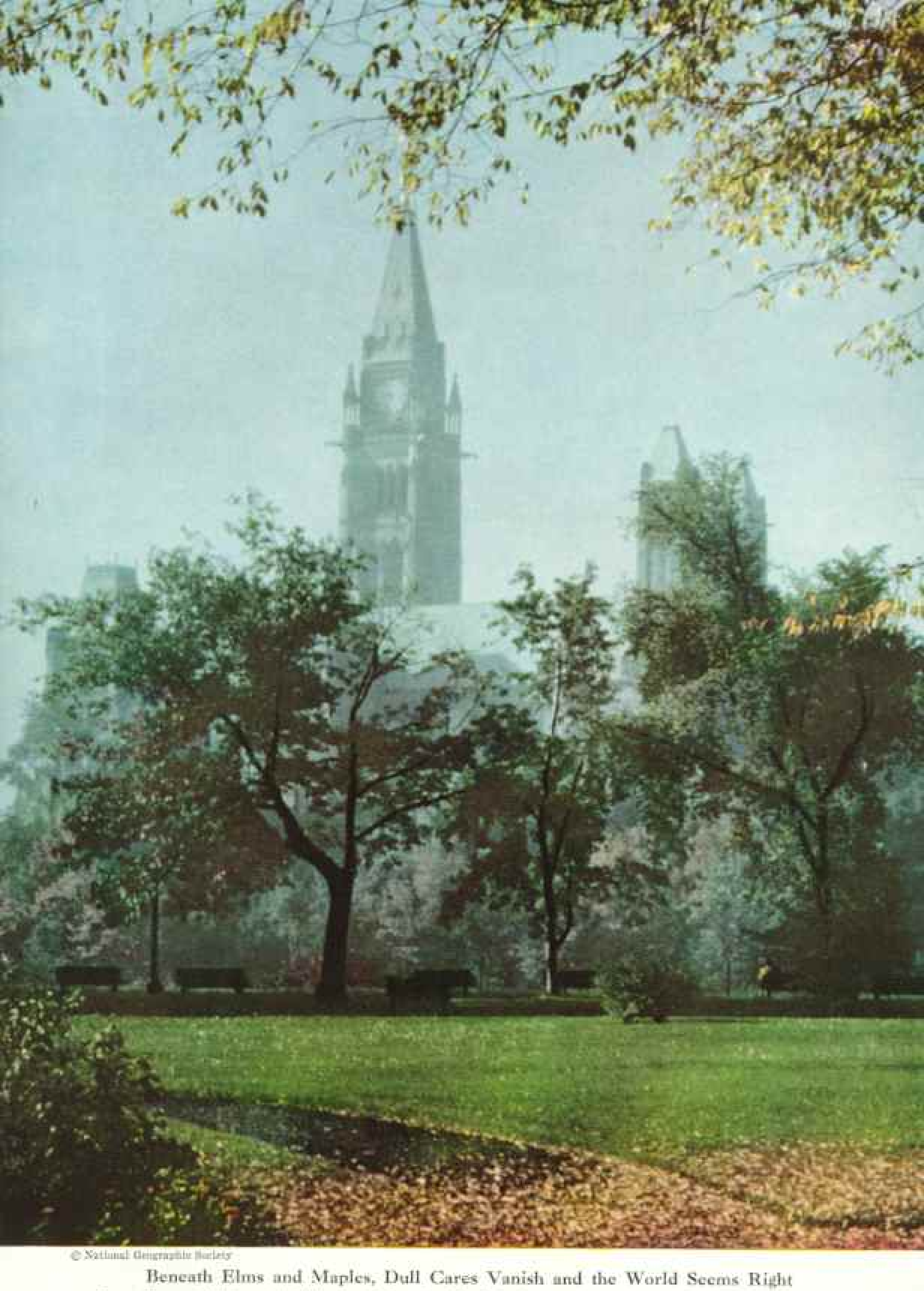
Zero Paints Roses on the Cheeks of Ottawa Children. Even Toddlers Are Adepts on Toboggans and Skis



© National Geographic Society

Kodachrome by John E. Fletcher

Canadian Schoolboys, Dreaming of Adventure, Take a Romantic View of Their Distant Arctic Countrymen



© National Geographic Society

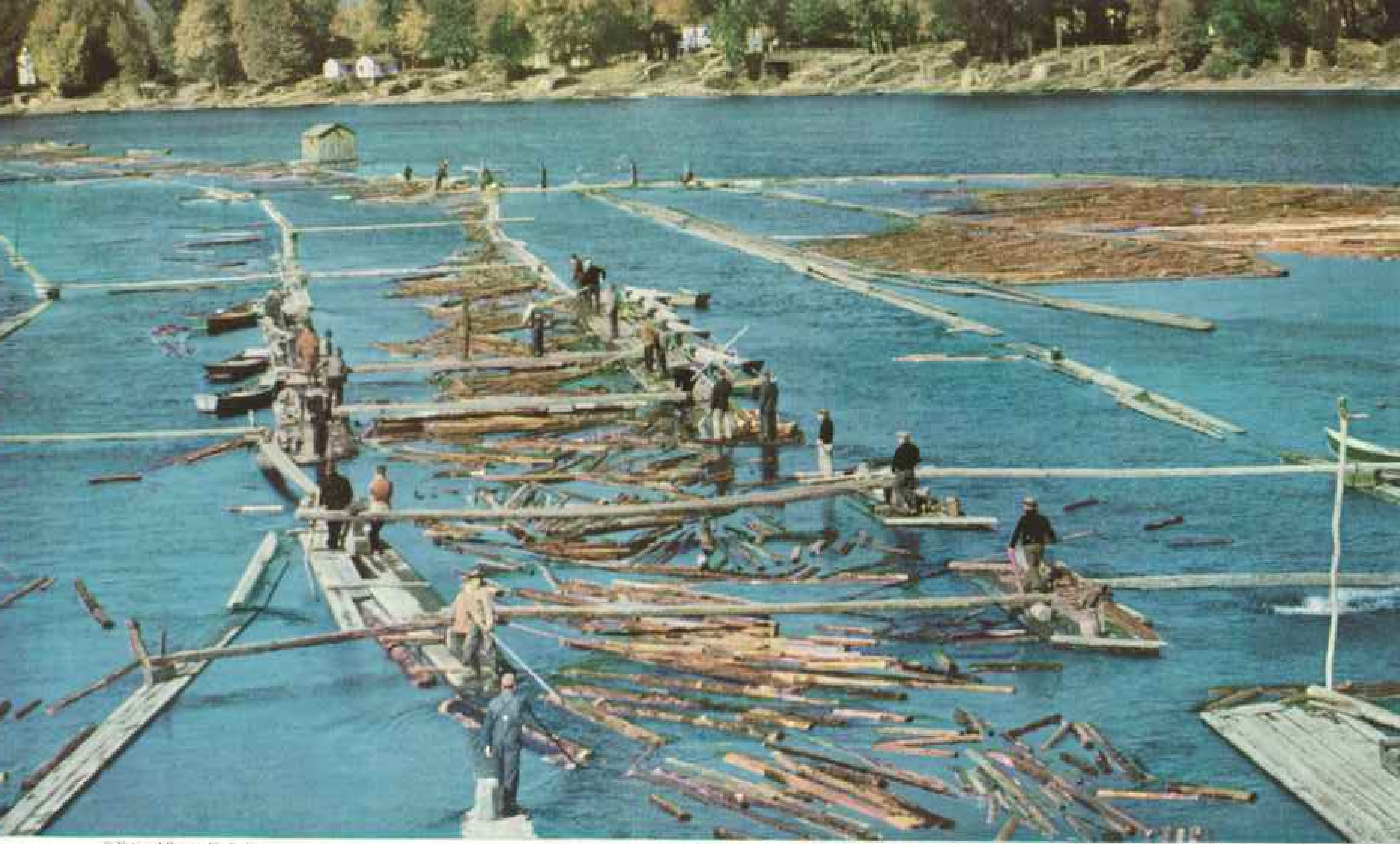
Beneath Elms and Maples, Dull Cares Vanish and the World Seems Right

Peace Tower, Parliament Building's 300-foot Gothic shaft, houses the clock, a reflection of the face that Big Ben shows to London. Its booming chimes may be heard for miles. As old as the tower appears, its memorial stone was laid within the memory of many Canadians. The Prince of Wales performed the ceremony in 1919.

Kodachrome by W. Robert Moore

Major's Hill Park in a Green-dream Mood Spreads the Vision of a Storybook Castle

Long ago the park was called Barracks Hill, for Colonel John By pitched camp here while his army dug a military canal, bordered in this view by the trees (Plate XV). Sleepy Bytown was named for him. Queen Victoria, by changing Bytown to Ottawa when she made it the capital, gave the honor to a river and an Indian tribe.

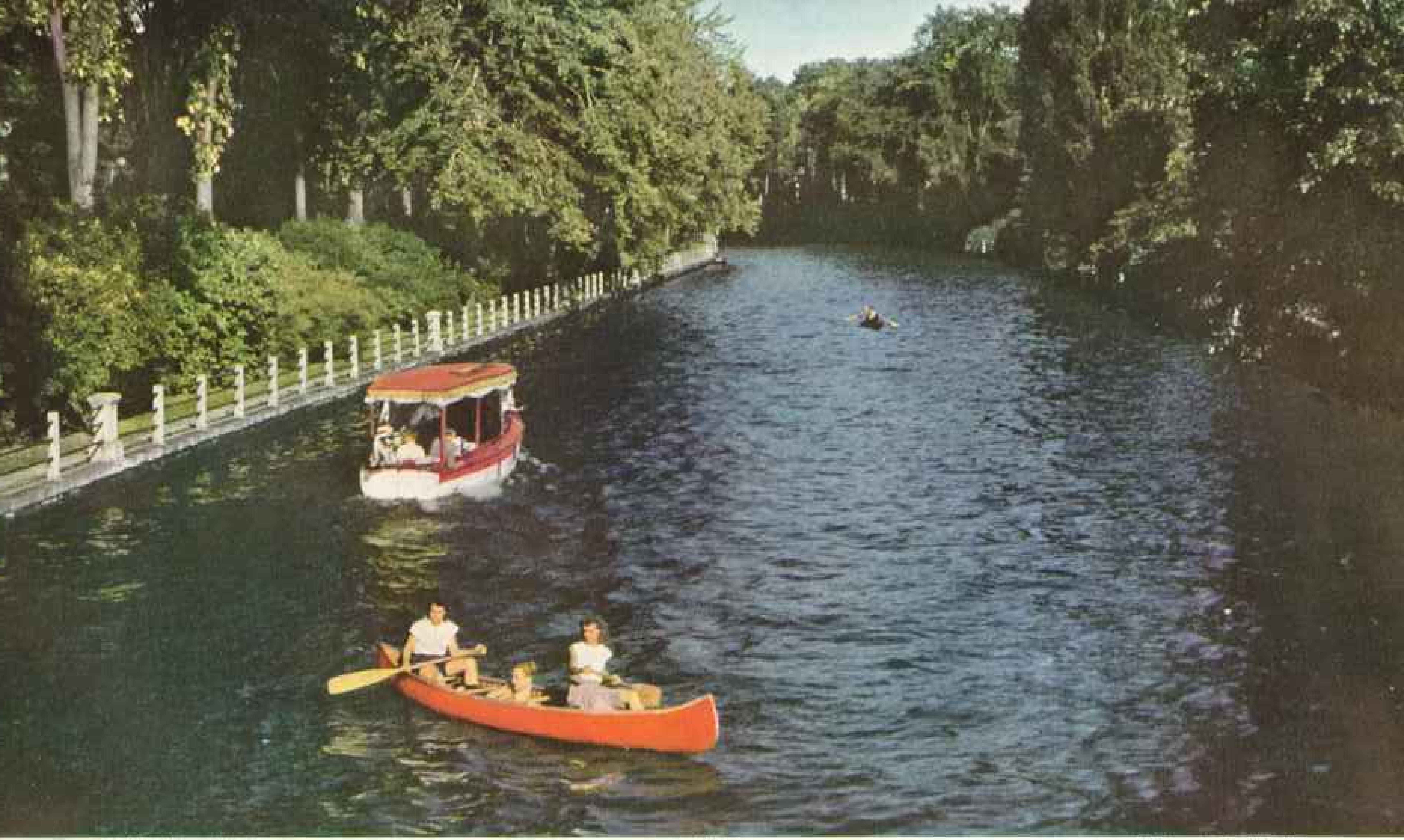


© National Geographic Society

XIV

Kodachrome by John E. Fletcher

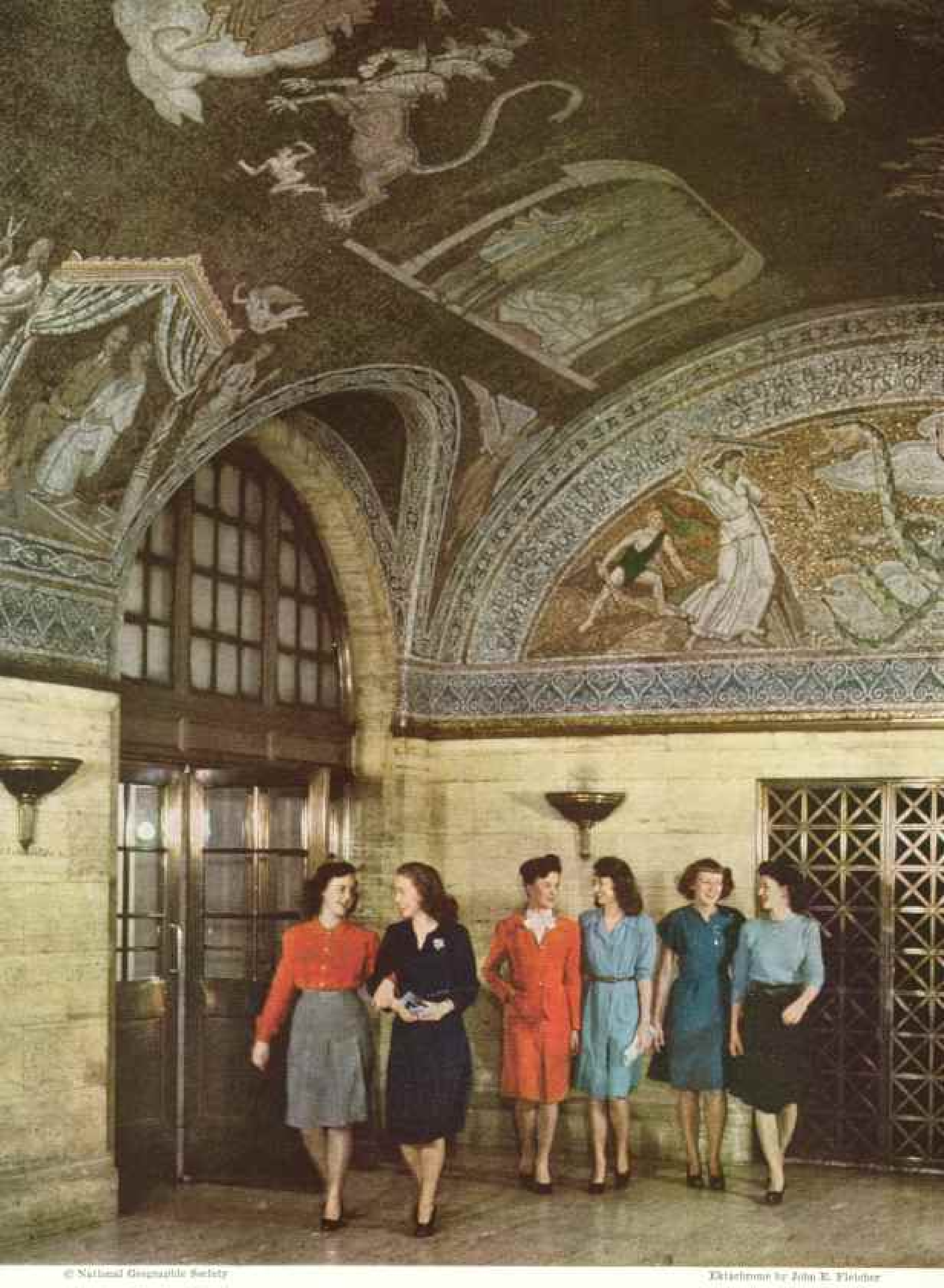
Tremendous Rafts Out of the Northern Wilderness Float Your Future Daily Newspaper to Pulp Mills near Ottawa



© National Geographic Society

Kodachrome by John E. Fletcher

Rideau Canal, Built for Warcraft Against the United States, Bears Pleasure Boats Instead. It Has Seen 120 Years of Peace



© National Geographic Society

Ektachrome by John E. Fletcher

Life Insurance Tells an Allegory with Mosaics in the Vestibule of an Ottawa Office Building

In its Canadian headquarters the Metropolitan Life Insurance Company pictures insurance as the "Great Mother" who protects helpless victims of misfortune. On the right she fights the "seven-headed serpent of disease." On the left she shelters the aged. "She is a guardian who never sleeps," says an inscription.

Delhi, Capital of a New Dominion

By Phillips Talbot*

THERE is a familiar ring to the great events taking place this year in the Indian capital city of Delhi.

An imperial power has made a whirlwind exit, leaving a country that contains one-sixth of the world's people. The withdrawal is big news, especially at the seat of power.

But bazaar patriarchs know that the process is nothing new.

Legends say the first conqueror established his headquarters on the key site of Delhi in the mists of time before history, and ever since then residents of the area have watched dynasties come and dynasties go.†

The most noticeable break from tradition in the British departure was that a conference table rather than a battlefield marked the succession, while a change of officials rather than a brutal sack inaugurated the new order in Delhi itself.

With traditional wisdom, some wise men of Delhi have long predicted these events. When, in 1911, King-Emperor George V announced the transfer of his Viceroy's capital from Calcutta to Delhi, seers recalled an ancient saying: "When a dynasty moves to Delhi, its days are numbered."

Britain's Last Viceroy First Governor-General

In its latest role, New Delhi becomes the capital of the Hindu-dominated Dominion of India, largest of the two entities created by partition. Rear Admiral Viscount Louis Mountbatten (now an Earl), who as Britain's last Viceroy brought the dominion plan to fruition, remains as Governor-General (Plates I, II, and page 598).

The smaller Dominion, Pakistan, with its Moslem majority, has chosen Karachi, on the Arabian Sea, in eastern India's Sind Province, as at least its temporary capital. Mahomed Ali Jinnah, president of the Moslem League since 1934, is the Crown's choice for Governor-General of Pakistan (map, p. 600).

There are strong reasons why each major contender for power in north India—the Rajput, the Afghan, the Turk, the Persian, the Mahratta, the Briton—has sought control of Delhi.

Here, in a narrow slot between the great Himalaya barrier and the sandy wastes of Rajputana, is the strategic command post separating the lusty civilizations of dry Central Asia and the Indus Valley from the green teeming wealth of the Ganges Valley and central India.

Delhi, in fact, is the inevitable capital of India whenever this sprawling country is under unified control. Centrally located, the city is 800 miles from Calcutta, 730 miles from Bombay, 675 miles from Karachi, and 520 miles from the Khyber Pass.

In modern times it has become one of the largest railway junctions in the country, the hub of lines extending to both coasts and to the frontier. Rapid development of postwar aviation in India makes it also the center of an extensive air network. The Grand Trunk Road from Calcutta to Peshawar passes through Delhi. The city is also the major trade distributing center of northern India.

Some Similarity to Washington

Like Washington, D. C., Delhi Province is small. Its 574 square miles were cut out of neighboring provinces to form a national capital. Also, like Washington, it has had difficulty winning a high degree of self-rule. The central government has run it under a bureaucratic administration.

Today's city, like all the earlier Delhis, lies on a narrow plain with the holy Jumna River on the east and what all residents call the Ridge, the northernmost spur of the Aravalli Range, on the west.

In 1941 the built-up area in this limited space seemed amply full with about 650,000 people. As a result of wartime expansion, however, 1,200,000 persons now live in the urban parts of the province. About 940,000 people have crowded themselves into the walled city where 522,000 lived before.

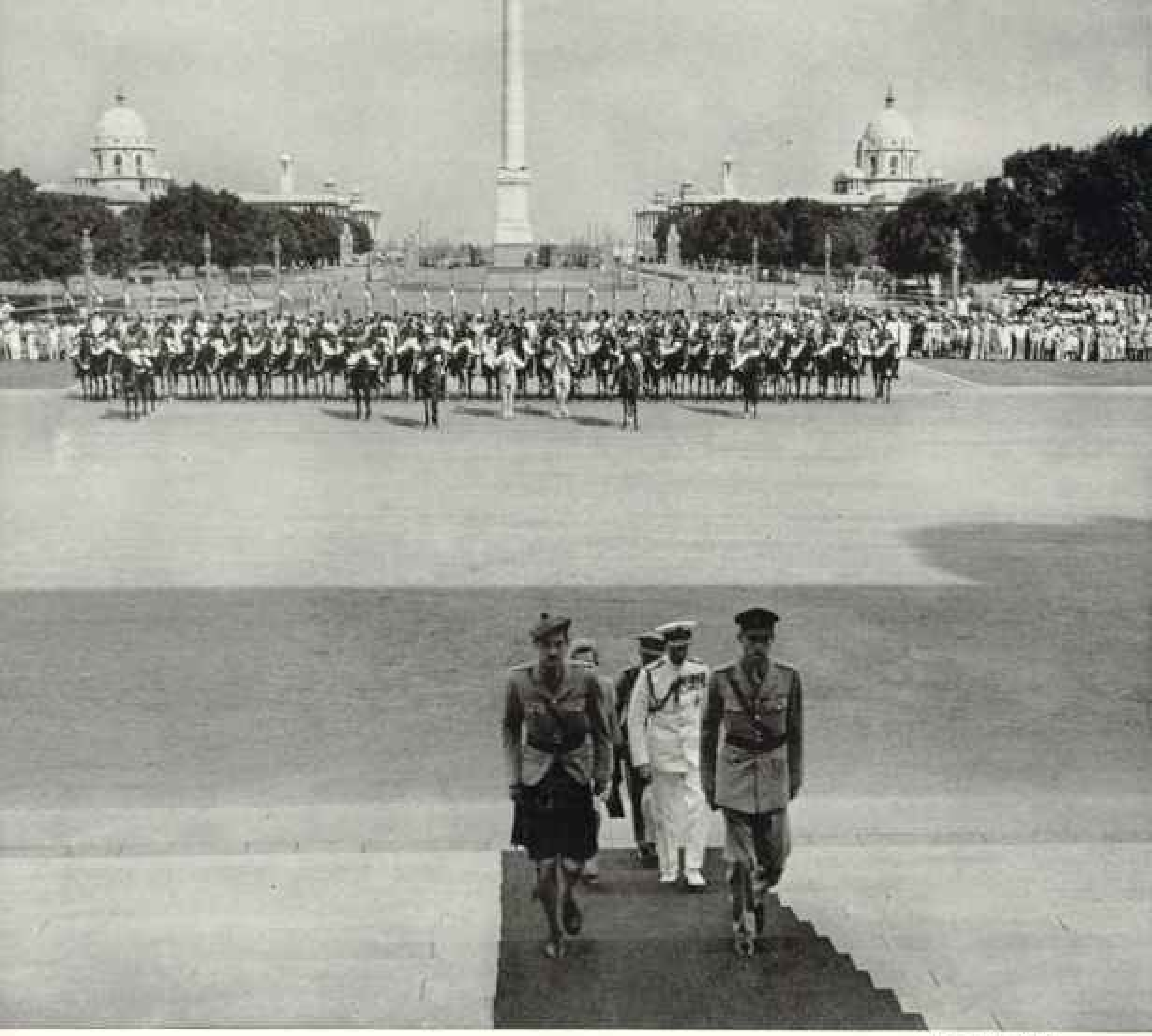
The elaborate, aloof New Delhi, which was opened in 1931 as a completely planned capital city with facilities for 70,000 residents, now holds 213,000 people in the original bungalows, in maharajas' town houses turned into hostels, in war-built American army barracks turned over to the Government of India, and in other temporary buildings.

How to provide this great number of people with adequate supplies of electricity and filtered water and to move them around on the overstrained streetcar and bus systems is a constant headache for the municipal committees. So far, despite shortages of charcoal in

---

* Mr. Talbot represents the Institute of Current World Affairs in India and is a correspondent for the *Chicago Daily News* Foreign Service.

† See, in the National Geographic Magazine: "Through the Heart of Hindustan," November, 1921, and "New Delhi Goes Full Time," October, 1942, both by Maynard Owen Williams; and "India Mosaic," by Peter and Frances Muir, April, 1946.



AP from Press Ass'n

Mountbatten, Central Figure of India's Drama, Arrives to Assume His Duties

The last Viceroy (in white uniform), first Governor-General of the Dominion of India, mounts the steps of his official residence in New Delhi (Plates I, II, and page 611). With him are aides and Lady Mountbatten. Behind mounted troops of his bodyguard loom the Jaipur Commemorative Column and the north and south blocks of the Secretariat (Plate VI).

the winter, of ice in the summer, and of food grains and cloth throughout the year, Delhi residents have managed to get along without critical breakdowns in living arrangements.

Sun Becomes a Summer Tyrant

The most important fact about Delhi, as both old-timers and new arrivals agree, is its climate. From late October into March, few parts of the world have pleasanter weather.

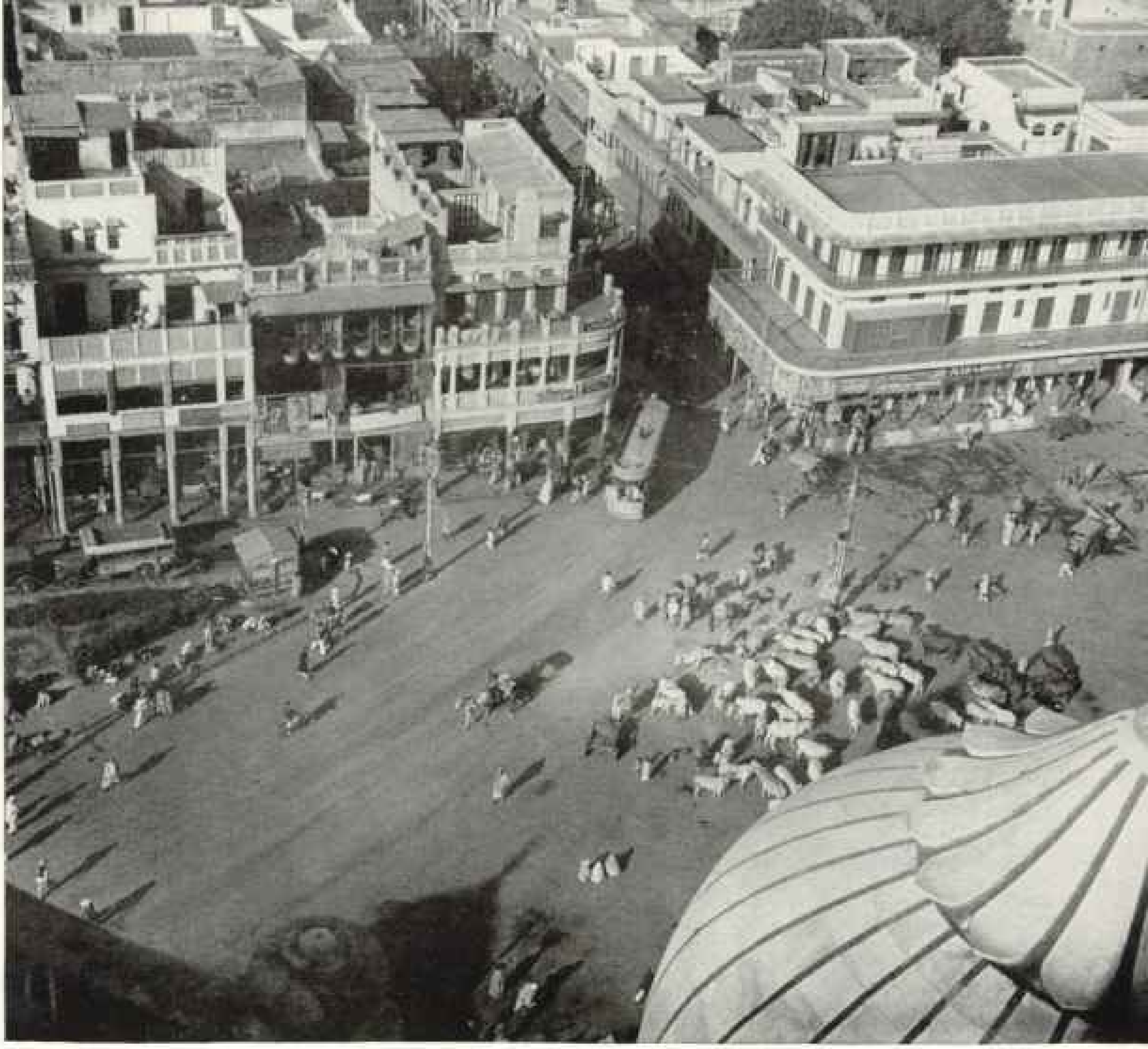
Crisp but rarely freezing nights interspace bright, clear days when the mercury reaches the 70's and 80's. These are the months when gardens bloom, sahibs enjoy hunting and shooting, and children and youths vigorously pursue their games on the playing fields.

Beginning in April, however, the sun becomes a tyrant. While officials' wives and children scurry to cool mountain resorts for six months' refuge, the multitudes who remain on the dry plain settle in as for a siege.

An air passenger from Bombay, arriving in New Delhi on a May or June day, steps from his plane at the Willingdon Airport into a hot blast like that of a motor exhaust. Driving three miles to the Hotel Imperial, he finds the wide macadam boulevards deserted.

Withered trees and grass and swirling eddies of dust accentuate the heat as the *loo,* a grit-laden 115-degree desert wind, sandpapers his skin, fills his eyes and ears, and coats his throat.

As likely as not, he can watch a dust storm darkening the sky and blotting out shadows of the sun, which appears as a distant, hazy orb. He is fortunate to get into the hotel



G. Nanda Nath

Delhi's Bazaar Section Comes to Life in the Early-morning Shadow of Jama Masjid

Viewed from the top of the Great Mosque (Plates XIV, XV), merchants and artisans head for their tiny shops while a streetcar clangs around a corner. Cattle, sacred to Hindus but a source of food to their Moslem owners, assemble to be driven to grazing grounds across the Jumna River (page 603).

behind the continuously wetted mats of *khas-khas* grass that cover the doorways.

Rains—averaging 26.84 inches a year and concentrated in the summer monsoon—afford some relief after June. On rainless days, however, the burning heat continues to the end of September.

All parts of Delhi suffer from the same heat—the walled city, the "civil lines" to the north, and the capital that spreads out southward. In a way, however, the comparatively prosperous residents of splendid New Delhi feel themselves in special difficulties.

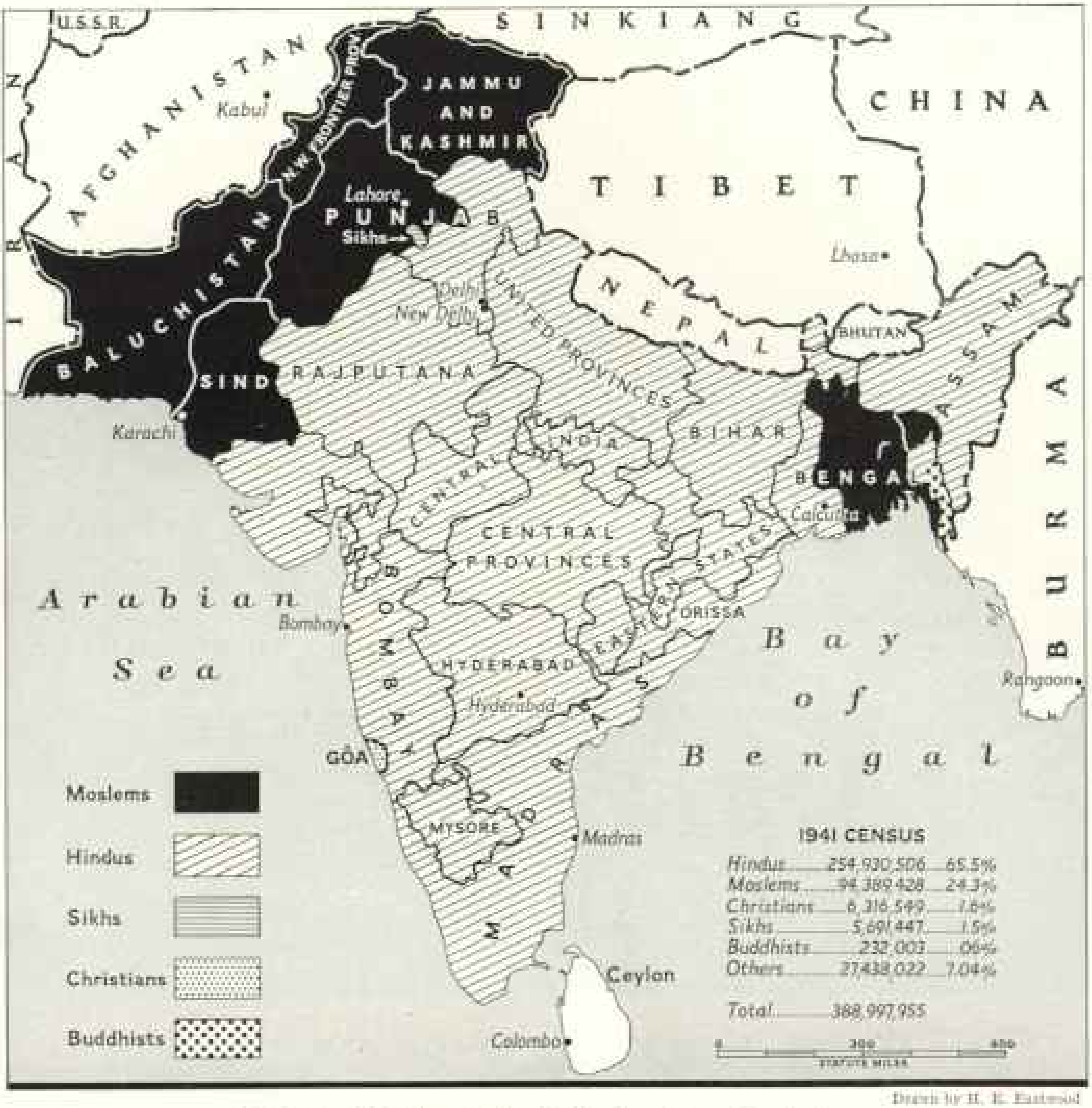
When Sir Edwin Lutyens and Sir Herbert Baker designed a grand capital "in every way worthy of this ancient and beautiful city," their idea was that the entire Government of India, with its officers, clerks, files, and communications, should move to the 7,200-foot heights of Simla each April and return only in October.

As a result, New Delhi was not built to give protection from the hot weather. Since wartime pressure and governmental expansion finally prohibited the annual trek to Simla, New Delhi in the summer months has become a city of seekers of refuge from the sun.

Bicycles Roll Along Broad Avenues

Despite grass mats, desert coolers, occasional air conditioners, and other contrivances for the flat-roofed, big-roomed houses and office buildings, the sun is not fully conquered. A vast bicycle brigade of Secretariat employees still rolls along, filling the broad tree-lined avenues each morning and evening, even when the temperature exceeds 110° (Plate VII).

The Indian capital, like that of the United


U.S.S.R.
SINKIANG
CHINA
AFGHANISTAN
Kabul
IRAN
JAMMU AND KASHMIR
N.W. FRONTIER PROV.
TIBET
Lhasa
Lahore
PUNJAB
Sikhs
BALUCHISTAN
Delhi
New Delhi
UNITED PROVINCES
NEPAL
BHUTAN
ASSAM
SIND
RAJPUTANA
Karachi
BIHAR
CENTRAL INDIA
BENGAL
Calcutta
BURMA
CENTRAL PROVINCES
EASTERN STATES
ORISSA
Arabian Sea
Bombay
BOMBAY
HYDERABAD
Hyderabad
Bay of Bengal
Rangoon
MADRAS
GOA
MYSORE
Madras
Ceylon
Colombo
Moslems
Hindus
Sikhs
Christians
Buddhists
0
300
600
STATUTE MILES

1941 CENSUS

Hindus	254,930,506	65.5%
Moslems	94,389,428	24.3%
Christians	6,316,549	1.6%
Sikhs	5,691,447	1.5%
Buddhists	232,003	.06%
Others	27,438,022	7.04%
Total	388,997,955	

Drawn by H. E. Eastwood

Differing Religions Split India into Two Dominions

Political boundaries still are too indefinite for accurate mapping, but Pakistan roughly corresponds to the two large Moslem areas in black. Most of the rest of India is under the Hindu Dominion's flag. New Delhi is the capital of Hindu India; Karachi of Moslem Pakistan. Soon after Britain withdrew, bloody fighting between the Moslems and the Sikhs and Hindus broke out in the Punjab, Calcutta, Delhi, and elsewhere.

States, is a city of boulevards converging in large, confusing traffic circles. New Delhi also has its plazas, vistas, and reflecting pools.

A city with one industry, government, it is built around the central seats of authority, the red sandstone and marble Government House (Plate II) and the twin Secretariat buildings (Plate VI and page 598).

From atop Raisina Hill, these bulky structures of mixed Palladian classic and Indian design look along the broad Kingsway to another hill where, four centuries ago, an earlier ruling house built the imposing Old Fort, or Purana Kila (page 630).

On either side of Kingsway, official residences and the town houses of princely rulers stretch away in succeeding large compounds. A mile to the north lies New Delhi's unusual shopping center, a double ring of shops around Connaught Place and Circus (page 602). Farther out in several directions is block after block of row houses where stenographers and messengers live.

Socially, too, the governmental atmosphere has dominated New Delhi. Participants in the capital's gay social whirl moved according to the Orders of Precedence. Official flavor was rarely absent from parties in the Imperial

Delhi Gymkhana Club, at the Racecourse, or even in many private homes.

Old residents, many of whom were departing as British authority withdrew, recognized that with the arrival of homespun-clad or angora-capped Indian politicians, New Delhi would develop new values.

"New Delhi, of course, is not India," almost any Indian will point out, probably recalling Clemenceau's reputed estimate that of all the capital cities on the site this latest "will make the noblest ruins of all."

Native Life in Old City

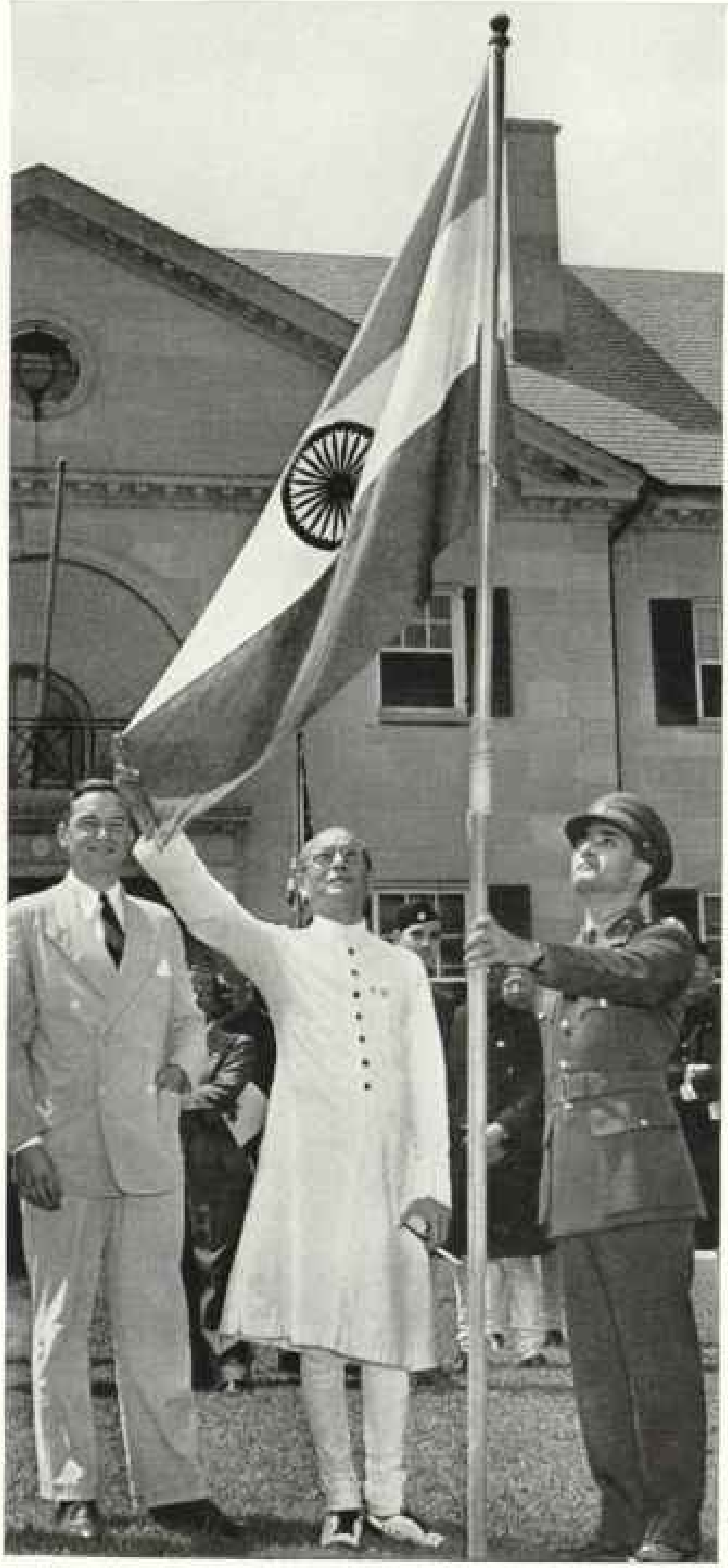
To get the authentic flavor of the country, a visitor is guided to the near-by walled city. There, instead of stately boulevards, he finds tight-packed lanes meandering between white-brick buildings that seem about to burst their seams, holding a family to a room.

The need for relief of this overcrowded zone was so desperate after the war that in recent months part of the southern wall of the city has been dismantled to give more breathing space and a little room for expansion. The 300-year-old bricks taken from the wall will be re-used elsewhere.

In the old city north Indian Pathans wearing flowing shirts and full pajamas mix with *dhoti*-wrapped Madrasis. Moslems live on some streets and Hindus on others; but there are lanes where they both still live cheek by jowl despite the blood-spilling riots of the last year.

In a few square feet of space they ply their different trades, rear their children, and eventually die, to be carried away either to the burial ground or to the burning *ghat*.

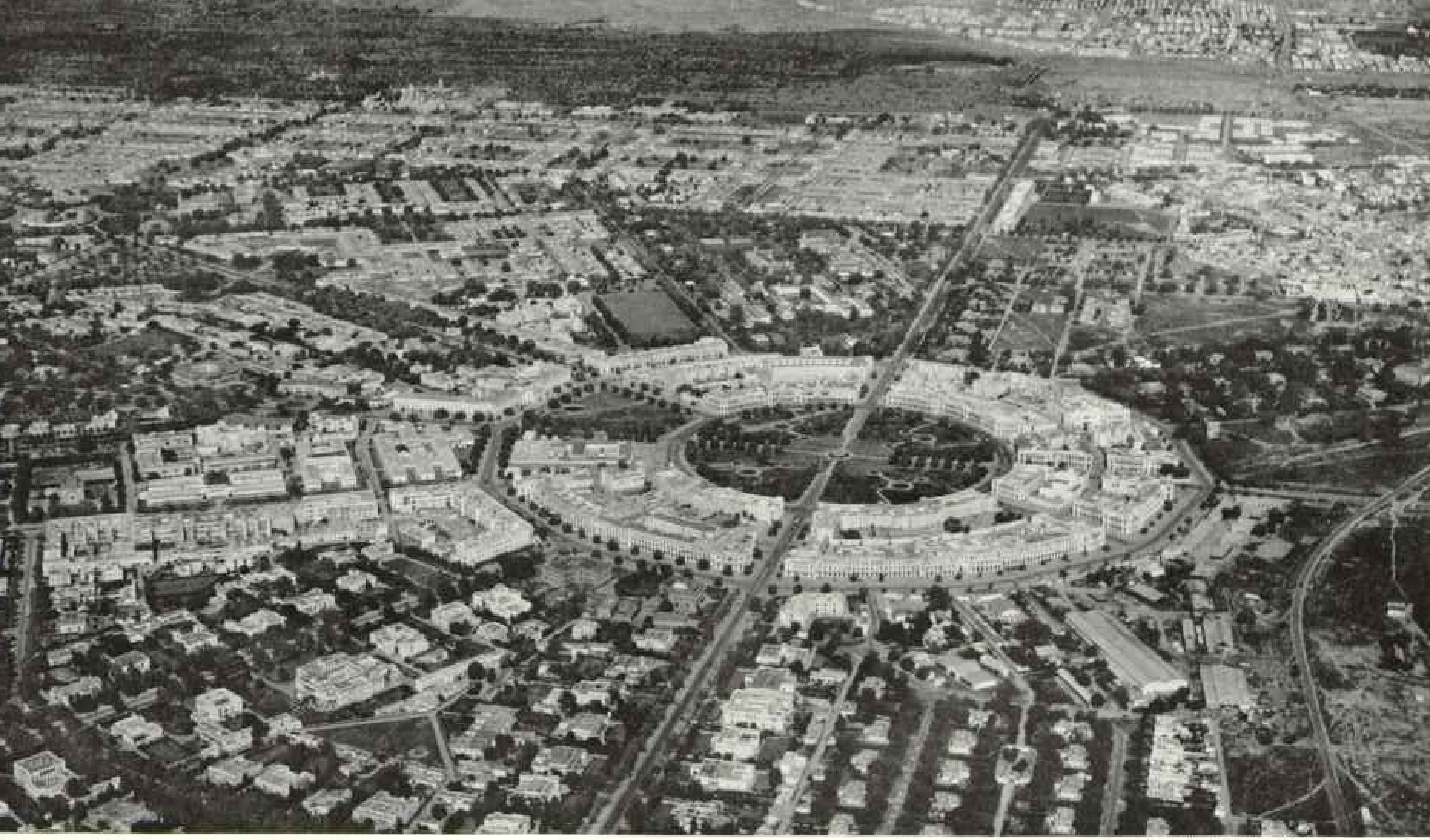
Day or night, except when a curfew is imposed, visitors wander through a complex of lanes and the bazaars of the silk merchants, the ivory carvers, the tinsmiths, the flower sellers, the jewelers, the carpenters, the



AP from Press Ass'n

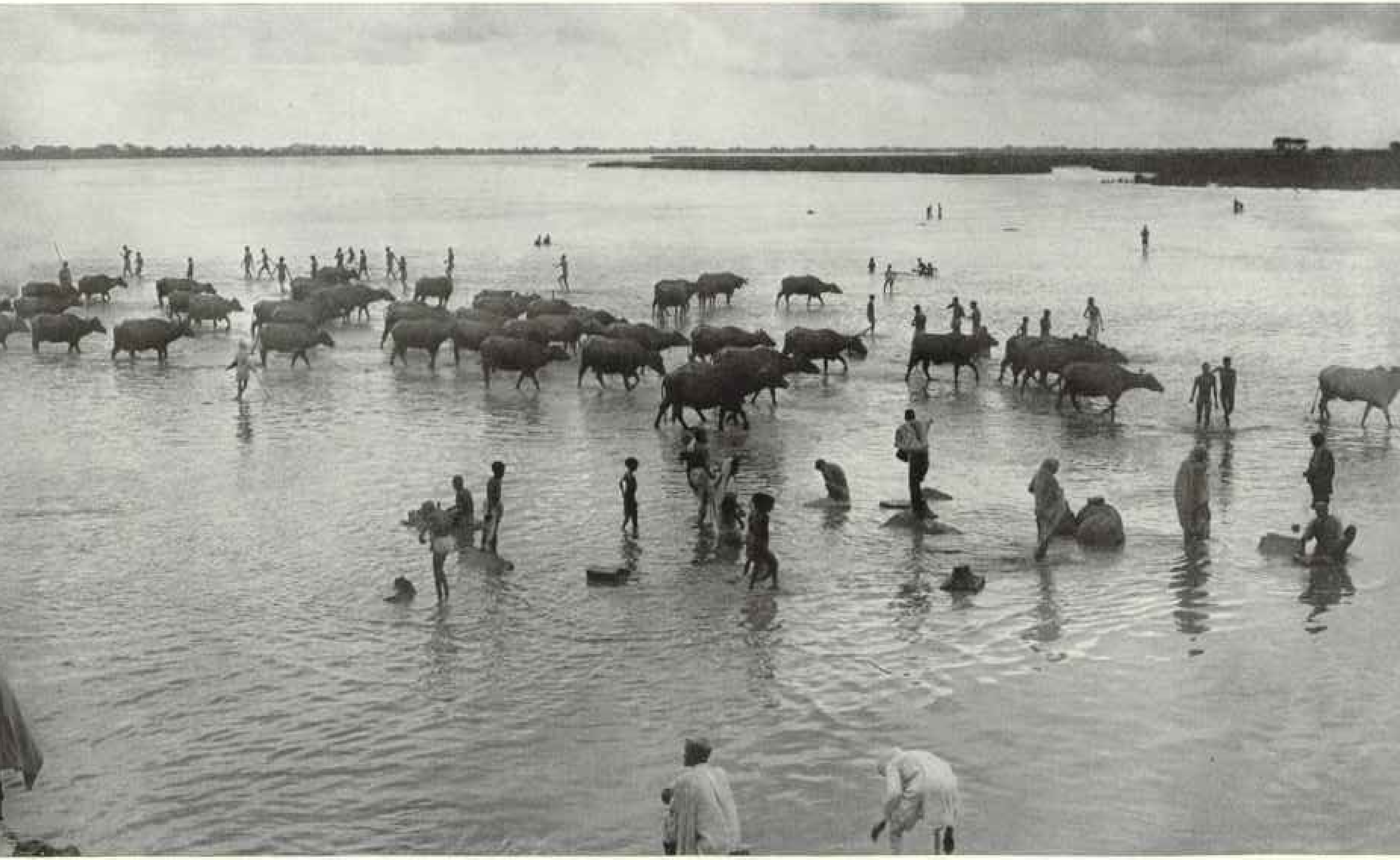
Hindu India's Flag Is Raised in Washington, D. C.

The saffron, white, and green banner bears Asoka's wheel, symbol of India's ancient culture, in blue. Participating in the ceremony are Samuel S. Stratton, of the Far Eastern Commission; Indian Ambassador M. Asaf Ali; and Col. B. N. Kaul, his Military Attaché.



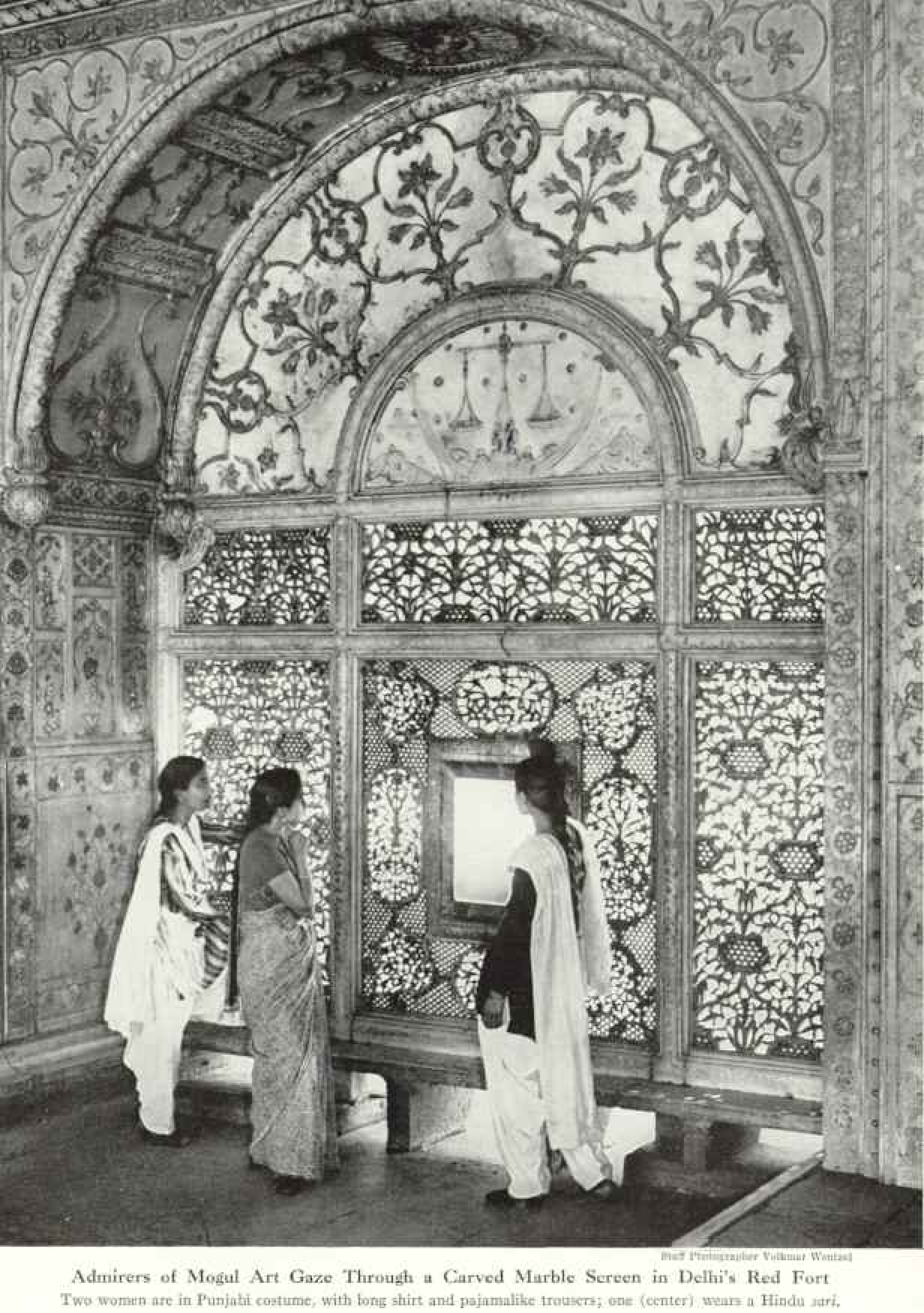
Air Transport Command, Official

Aerial Visitors See Broad Avenues Shooting Out from Connaught Circus, New Delhi's Modern Business Center



B. Baffin

Near Delhi, Water Buffaloes Join Bathers in an Early-morning Dip in the Shallow Jumna River



Staff Photographer Volkmar Wentzel

Admirers of Mogul Art Gaze Through a Carved Marble Screen in Delhi's Red Fort

Two women are in Punjabi costume, with long shirt and pajamalike trousers; one (center) wears a Hindu *sari*.

Staff Photographer Volkmar Wentzel

Followers of Florence Nightingale Are These Sari-clad Indian Girls

At New Delhi's College of Nursing they watch an instructor and his student assistant dissect an animal in anatomy class. The school, offering a four-year course, draws young women from throughout India as old taboos which relegate women to the seclusion of *purdah* are gradually broken down (page 650). Practical experience in hospitals, health centers, and homes supplements classroom and laboratory work.

iron merchants, the brass workers, the silversmiths, the embroiderers, and the food vendors. They stroll through the wholesale and trade areas, or go past the cotton mills.

The focus of this pageant of colorful and multiple activity is Chandni Chauk, the "Silver Street," a long, straight roadway cut through the walled city by the Mogul builder Shah Jahan.

Many Modes of Dress

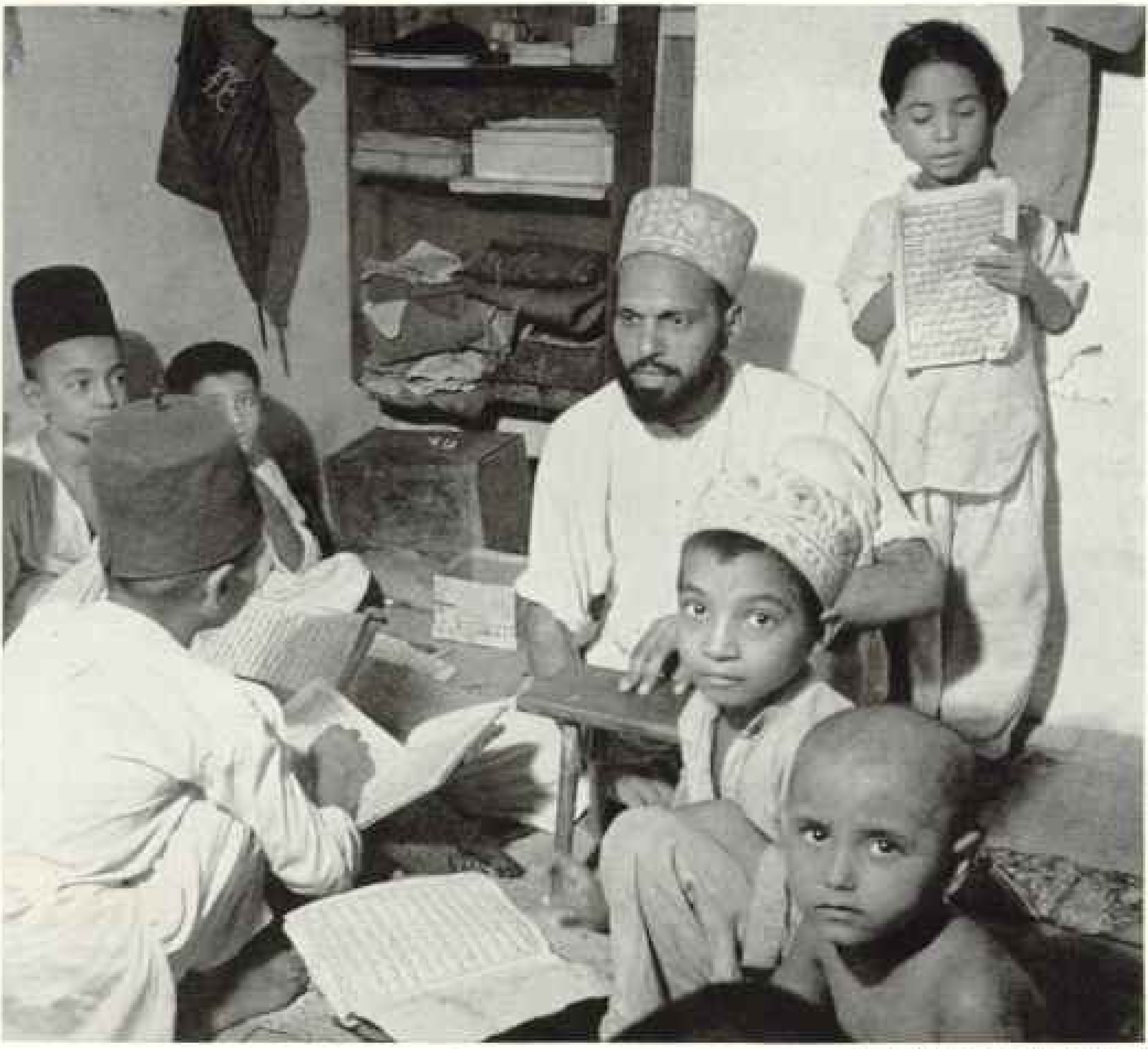
One of the great streets of Asia, this is a roadway of people. On it the sightseer finds traders from Afghanistan and from Hyderabad, merchants of Bengal and of Gujarat, saffron-robed Hindu *sadhus* (religious men, often itinerant), bearded Moslem *sufis* (mystics), beturbaned Sikh ascetics, moneylenders, artisans, peons, sweepers, bank clerks, soldiers, travelers, and residents.

Men in their dhotis and shirts or in long *sherwani* coats and pajamas pass alongside women in gaily colored *saris* or in Punjabi tunics and trousers (page 604 and above). Chandni Chauk displays as many modes of dress as there are in India—including the nakedness of some Naga devotees who believe in no clothes at all.

As everywhere in Delhi—as in fact in most Indian cities—cattle ramble at will over Chandni Chauk, while resigned drivers of automobiles, streetcars, and horse *tongas* make way for them. Bullocks drawing carts, equally slow, are a little more disciplined than the cows and water buffaloes, but add to the hazards of traffic.

From sweetmeat stalls pungent odors spread down the street to mix with the aromas of sun-softened fruits, of frying meat and baked unleavened breads, of brewing tea, of peppers and chilies, and of the eternal crush of people. If New Delhi isn't India, Chandni Chauk with its devious offshoots surely is—or at least the urban part of it.

One of the most Indian features of Delhi is its attention to religion. Hindu shrines, Buddhist and Jain temples, Sikh *gurdwaras* (places of worship), and Moslem mosques dot



Staff Photographer Volkmar Wentzel

Mohammed, Instead of Mother Goose, Helps Young Moslems Learn to Read

These Delhi boys, four to eight years old, go to school in a small room near the Great Mosque (Plates XIV, XV). Learning by rote, they recite passages from the Koran after their fezzed teacher. A new educational program provides for free and compulsory education for Indian children, as well as a campaign to reduce illiteracy among adults.

the city, while here and there a Christian church shows the influence of the West.

Among Hindu families, old mothers frequently prefer the family shrines in their own homes, at which they offer daily prayers that their more modern children may return to traditional piety. Yet attendance at temples is good.

One of the most unusual structures in New Delhi is the Lakshminarayan Temple, built nearly ten years ago by a member of an Indian family of industrialists, Raja Baldevdas Birla (Plate IX).

"This temple," says the inscription at the gate of the florid structure, "is open to all Hindus (including Harijans),* subject to prescribed conditions of cleanliness, full faith, and sincere devotion."

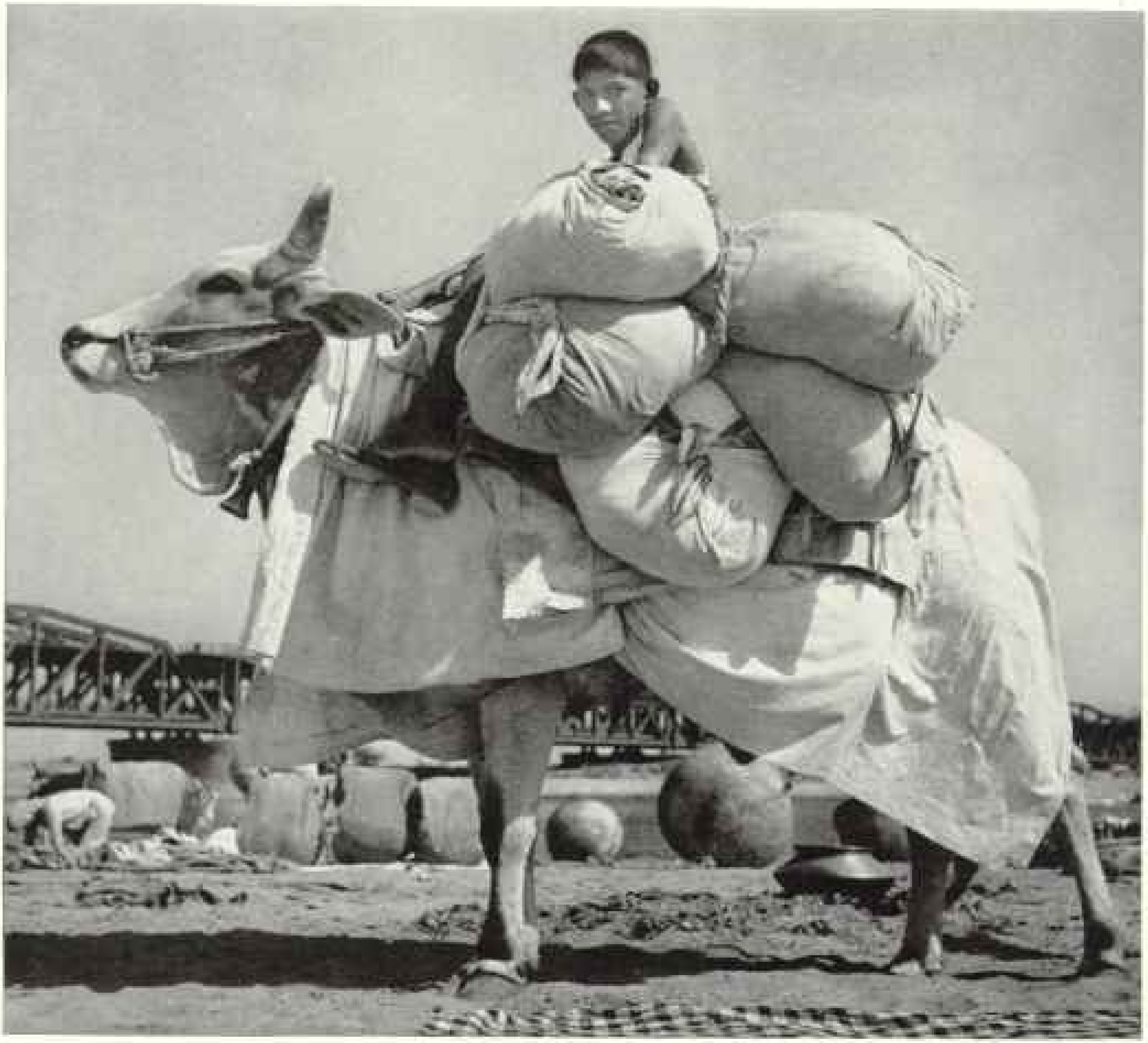
Buddhist, Jain, and Sikh worship places are included in it. Inside the block-large compound, the major buildings are a wonder of elaborate detail in a modern version of ancient temple architecture, while gardens behind hold playgrounds and grottoes that are a special delight to the young.

Gandhi's Delhi Headquarters

Less ornate, but with its own significance in the community, is the tiny Balmiki temple alongside a colony for Outcaste sweepers. A little schoolroom attached to this temple is Mahatma Gandhi's Delhi headquarters. During his visits to the capital city, many impor-

---

* *Harijans*, "Elect of God," is Gandhi's name for the Outcastes, also known as the Depressed Classes and Untouchables.



Staff Photographer Maynard Owen Williams

In Delhi, Laundry Is Delivered by Bullock

Although bullocks are sacred in India, they often are used as beasts of burden. This animal carries a big load for a *dhobi*, or washerman. Many dhobis scorn soap and washboards, and wash clothes by beating them upon rocks at the edge of a stream. The customer often gets his shirts back in shreds and minus buttons.

tant men of India, ranging from party chiefs to Viceroy's advisers, have come to the humble square.

Each evening a little before sundown, when in Delhi, the Mahatma held a prayer meeting that included readings from many scriptures. After prayers, he regularly addressed the congregation on any topic that came into his mind.

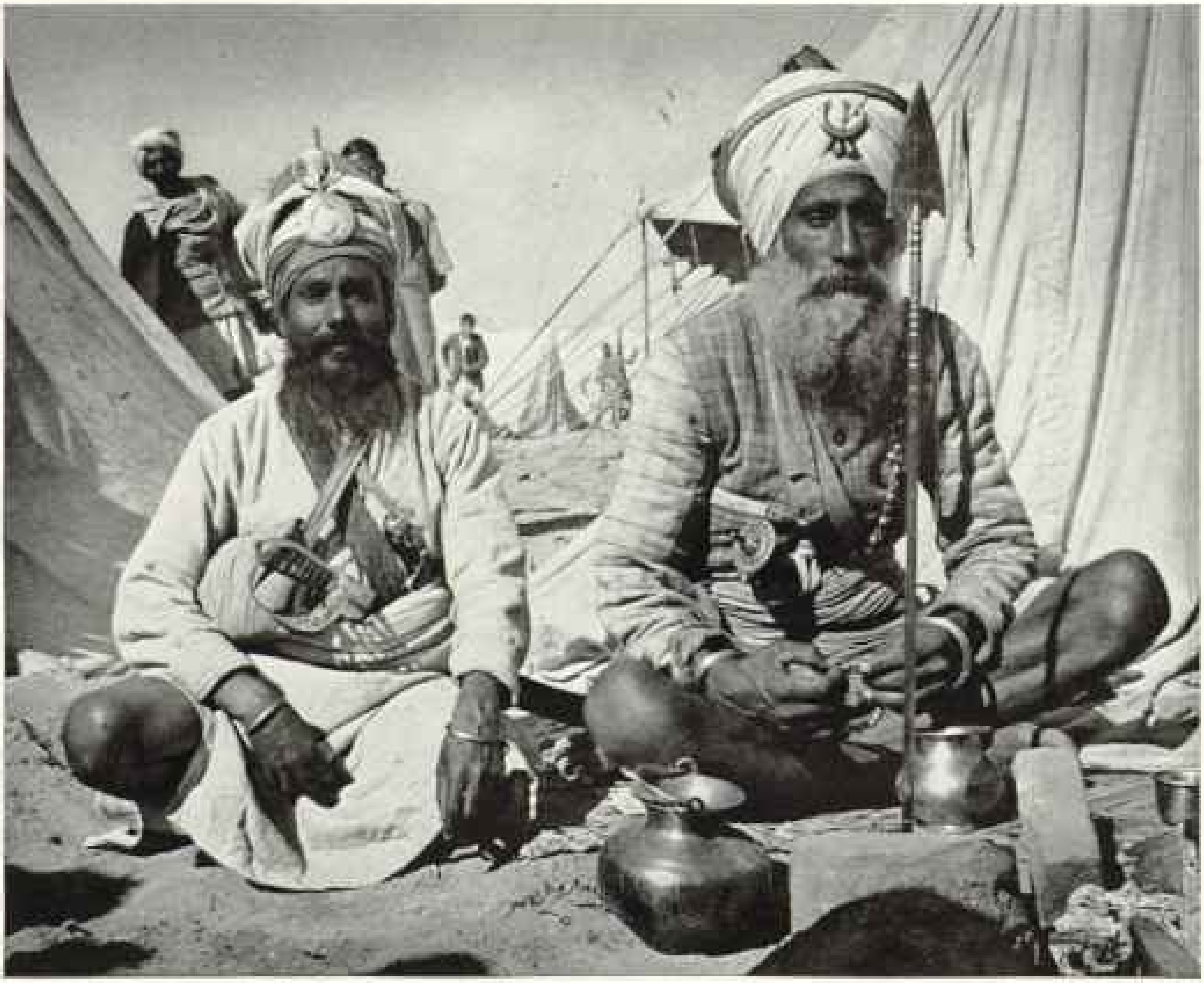
Frequently Gandhi chose this simple outlet for important political announcements. Listeners might hear his reactions to the latest Moslem League resolution, his observations on London's policy, or his views on village sanitation, women in *purdah*, and Hindu-Moslem relations.

Interspersed among these and many other Hindu temples are the sacred places of Delhi's devout Moslem population. They range from tiny white neighborhood mosques to one of the great mosques of the world, the slender-minareted, gracefully domed Jama Masjid (Plates XIV, XV and page 599). In this historic monument reposes part of the fame of the Mogul emperor Shah Jahan as a builder.

Troubles Forgotten on Holi Day

Holidays, among both Hindus and Moslems, are one of the chief features of Indian life, in Delhi and elsewhere. One of the gayest is *Holi*, usually in March, which marks both the lunar New Year and the approaching harvest of the winter crop (Plate XVI).

On New Year's Day the normally somnolent streets take on an air of happy razzle-dazzle. Everyone goes abroad with a package of colored powder in his pocket; when friends meet they smear a little red dust on each other's forehead and then embrace. This is a solemn



Victor Kayfetz from Three Lions

Sword and Spear Symbolize the Sikhs' Martial Spirit

These Sikh priests, attending a Delhi festival, wear the "five K's" prescribed for orthodox members of their sect: *kes*, unshorn hair; *kachh*, knee-length drawers; *kara*, iron bracelet; *kirpan*, short sword; and *kangha*, comb worn under turban. Many Sikh soldiers in the Indian Army were cited for bravery.

greeting, symbolizing the renewal of old friendship for the coming year.

Holi is a day when all people are supposed to forget their troubles, their enmities or quarrels; love and goodwill are to prevail.

To give expression to this carefree spirit, many of the celebrants, especially the younger element, arm themselves with spray guns with which they squirt colored water on all and sundry. It is advisable for all persons, including foreigners, to wear old clothes on the streets on Holi day.

My over-all impression of Holi was the goodwill and disregard of social position which prevailed. Traditionally, the sweeper in the street is on this day supposed to mingle democratically with the well-to-do merchant. Such manifestations of brotherliness on festive occasions mitigate the social inequality, perhaps by design of the upper strata, for they may serve to keep the sweeper content with his lot.

To see another facet of the real India, the raw India of conflict and stress, as compared with sophisticated Delhi, I recently traveled for five days in order to walk for an hour with Gandhi.

It was revealing to watch this fragile, 77-year-old ascetic throwing himself, during a critical period, into the remoteness of Eastern Bengal's Noakhali district for a barefooted village-to-village pilgrimage in search of Hindu-Moslem amity.

40 Acres Support Nearly 100 Persons

The region in which Gandhi secluded himself is deep in the Ganges-Brahmaputra Delta, one of the least accessible flat lands of India. Hardly a wheel turns in this teeming, jute-and-rice-growing area. I saw no motorable road. The bullock cart, one of India's truest symbols, does not exist here. The civilization is amphibious, as the fields are always flooded between April and October.

In the wet season little remains above water

Staff Photographer Volkmar Wentzel

"Business Is Where You Find It," Say Delhi Barbers

Here an itinerant trimmer of locks shaves a customer who sits comfortably on his own *charpoy*, or bed. Ready to serve in home or on sidewalk, the barber carries razors, scissors, clippers, and other equipment in a belt around his waist. Sikhs give him no business (opposite page).

except occasional ribbons of earth bund and isolated village clumps marked by coconut palms, bamboos, and betel trees. People stay at home or, at best, move about in hand-hewn skiffs. Though some of their crops grow under water, they farm mostly in the dry winter season.

Here, in an entirely rural area of 1,600 square miles, are jammed nearly 2,500,000 people: over 1,500 per square mile, or more than two per acre.

Reflecting on these conditions, I wondered what Illinois farmer, for instance, could feed, clothe, and house nearly 100 persons on the yield from the south forty.

Eighty percent of these farmers are Moslems. Apart from a few wealthy families, they "have nothing but their numbers," in the words of one senior Moslem official. They suffered severely in the 1943 Bengal famine.

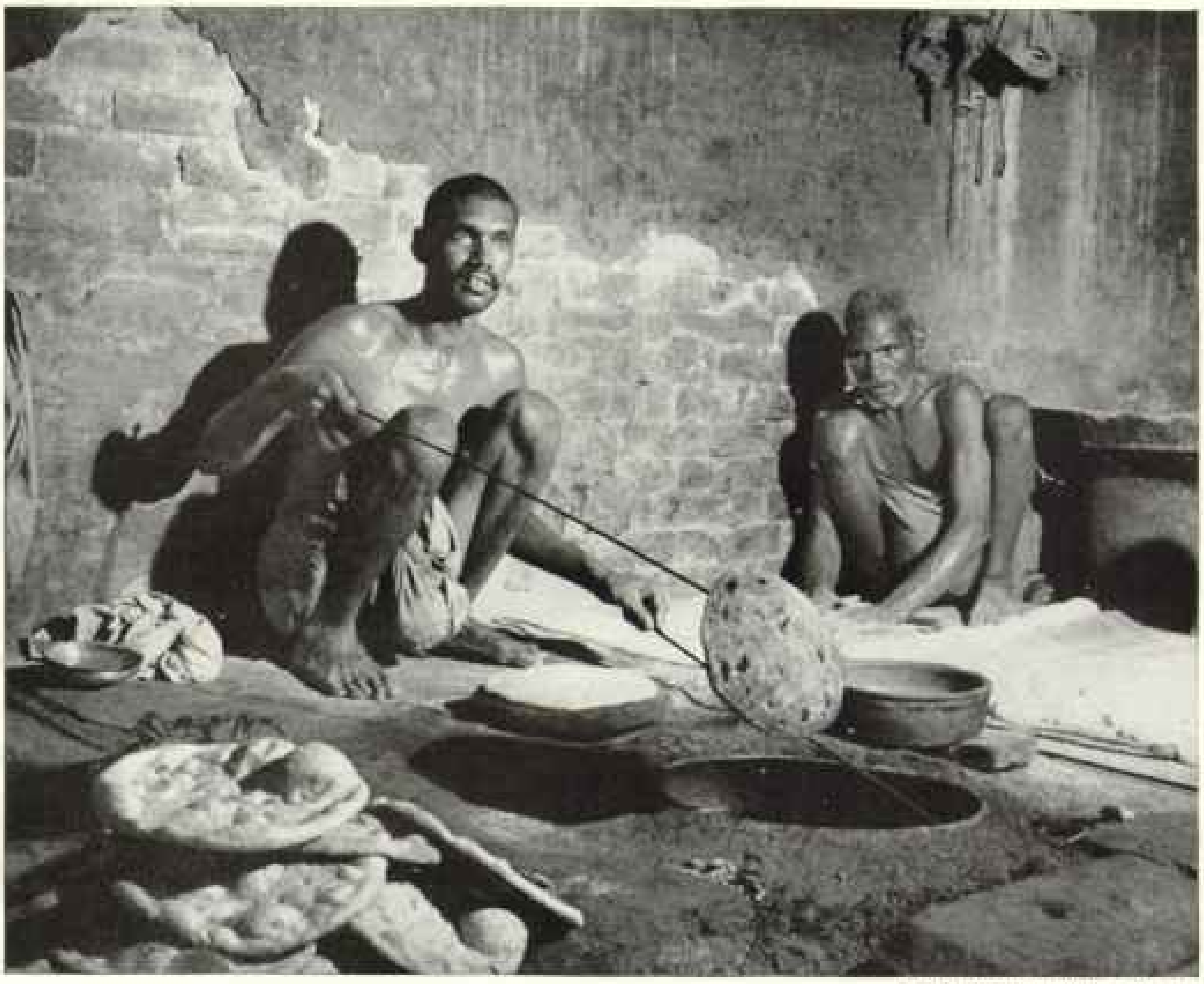
The tiny Hindu minority consists mostly of farmers and low-caste village artisans.

In this closely packed, rupee-starved, isolated district terror struck in the fall of 1946, in the wake of Hindu-Moslem strife in Calcutta and other Indian cities. It was the first real flare-up in a rural area.

Roving bands paddled over the flooded fields from village to village, killing Hindus, looting and burning their property, abducting some women, and registering conversions from Hinduism to Islam.

Perhaps a million people were caught up in the turmoil, and refugees eventually were counted by the tens of thousands. But the effect was multiplied a thousandfold across the breadth of Hindu India by exaggerated, inflammatory reports of what had occurred.

These statements may be compared with final casualty and loss figures agreed to by the Bengal (Moslem League) government and the British governor and his staff. They have reported that not more than 200 people were killed in the uprising. Two cases of



Staff Photographer Volkmar Wentzel

Delhi's Bread Comes Piping Hot from Underground Ovens

A wood fire burns in the oven, the bowl-shaped hole in foreground. While one man mixes the dough (right), another kneads it into a pancake-shaped *chapatti* on the round stone before him, then slaps it on the oven's inner wall. After a few minutes' baking he lifts it out with a long rod.

abduction and forcible marriage were proved.

This was the pitch of feeling in India when Gandhi decided to go to Eastern Bengal himself. A few days before he left Delhi, my wife and I walked with him for half an hour in the sweepers' settlement where he stayed, and talked of the wave of mass fratricide which was then rolling over the country.

Although he denied letting emotions affect his judgment, we sensed a feeling of frustration, if not of failure. This had nothing to do with the creed of nonviolence itself. Its truth, he repeated, could never be challenged. But he could not be happy with the way in which his teachings were being flouted. To test the applicability of his faith, therefore, he went to the heart of the trouble.

A New Chapter in the Gandhi Epic

In a tiny village that suddenly acquired fame, bustling visitors, police attendants, press observers, and even telegraph facilities, Gandhi settled into a hut and began meeting people, hearing their stories, and assessing the task ahead of him.

Finally, on January 2 of this year, he began the trek that will take its place in the Gandhi epic as the Eastern Bengal march. Such a pilgrimage is an astonishing sight.

With a staff in one hand and the other on a granddaughter's shoulder, the old man briskly took the lead as the sun broke over the horizon.

He usually wrapped himself in a hand-woven shawl, as the January mornings were cold enough for him to see his breath. But he walked barefoot despite chilblains. This is a fashion he started in order to relieve a blister, but continued because he liked the idea of walking as Indian pilgrims normally travel.

Clustered about him was his immediate party: his Bengali interpreter, a professor of geography at Calcutta University; a Sikh attendant; a retired engineer-turned-swami,

Staff Photographer Volkmar Wentzel

Well-wishers Beam upon Shy Bride and Bearded Groom at a Sikh Wedding

Here the girl's veil has been removed, and she and her husband-to-be see each other for the first time. With relatives and friends, they face the priest's dais in a Delhi home, ready for the ceremony to begin. Sikh religion, founded by Guru Nanak, a dissenter from Hinduism, forbids divorce.

and one or two youths. A squad of policemen mixed with the group.

As the sun began to climb, villagers from places along the way joined the trek. They came by twos and fours or by dozens and scores, swelling the crowd as the snows swell India's rivers in spring. They pressed in on the old man, while their children danced around the edges of the moving body.

Here, if I ever saw one, was a pilgrimage. Here was the Indian idea of sainthood: a little old man who had renounced personal possessions, walking with bare feet on the cold earth.

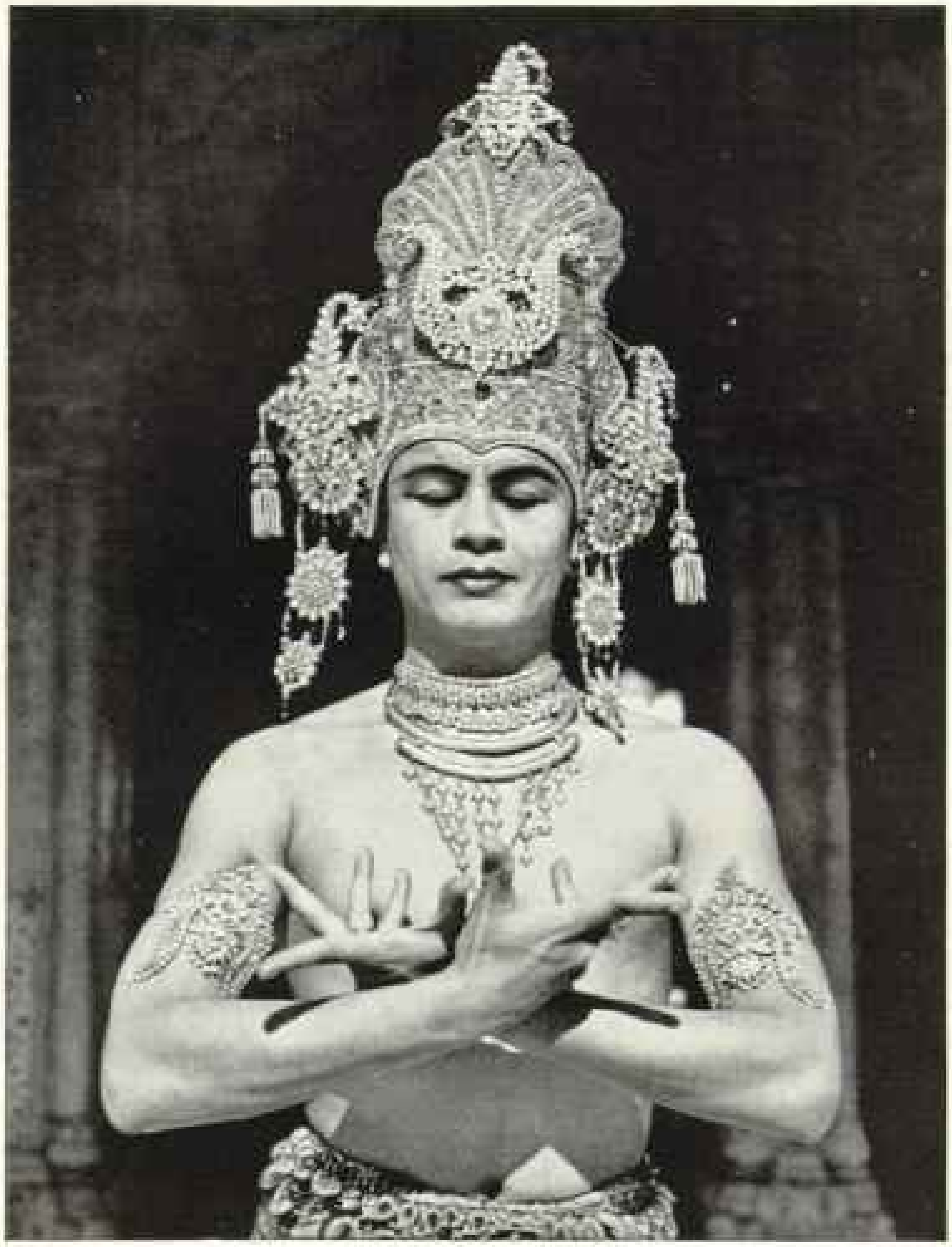
End of an Empire

To return to Delhi from these scenes afforded the ultimate in contrasts. The effect was heightened by an excited stir over the advent of Viscount Mountbatten, successor to Viscount Wavell as Viceroy.

Mountbatten achieved an agreement that cabinet ministers and his predecessors in the Viceroy's House had tried for but failed to obtain. At the swearing-in ceremony in resplendent Durbar Hall, on March 24, he looked dramatic in his white rear admiral's uniform with rows of ribbons and the broad blue ribbon of the Order of the Garter as he stood before the red-velvet backdrop behind the throne chair to which he had fallen heir (Plate I).

In the ensuing weeks he conferred steadily with Indian leaders, toured critical areas, and sped back to London to put across his conclusions. Then he abruptly announced that British power would leave India not in June, 1948, but in August, 1947.

"Mountbatten's amazing," Khwaja Nazimuddin, former Bengal premier and a member of the Moslem League high command, told me. "He knows when to listen to Jinnah, when to agree with him, when to take his advice, when to bully him, and when to let him down with a bump. The extraordinary thing is



Staff Photographer Volkmar Wentzel

With Rhythmic Gestures He Portrays a Hindu God

Ram Gopal, famous Indian dancer, wears the headdress of Siva, often represented as Lord of the Dance in Hindu folklore. His jewelry designs were copied from temple sculptures. Indian dancing, highly stylized, has a "vocabulary" expressed by movements of the hands, eyes, and body, requiring rigid control of the muscles (Plates X, XI).

that Jinnah likes him and thinks he's fair."

A surprising group of converts to the Mountbatten style is the Viceregal permanent staff that aided Wavell through the difficult years after 1943. Many of these at first felt it a personal affront when their respected chief was suddenly recalled in favor of the handsome young admiral.

After Mountbatten's arrival, Viceroy's House brightened up with a series of parties that would never have been organized in a regime noted for its regard for rationing rules and lack of ostentation.

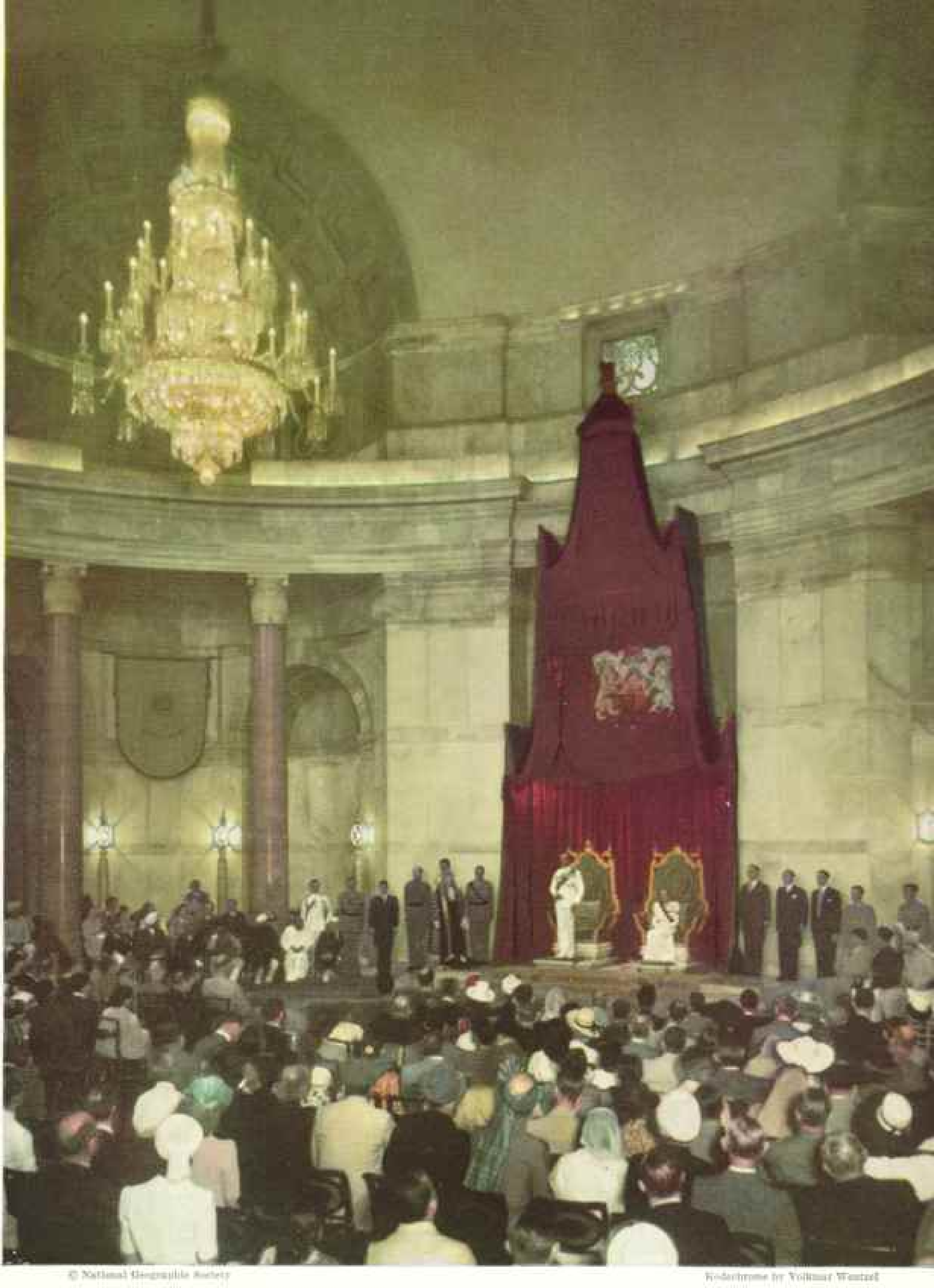
"We're going," Mountbatten told a friend, "but that doesn't mean we should slink out with our tails between our legs, does it?"

Lord and Lady Mountbatten increased their popularity by their manner of receiving guests. Although some of their lines were reminiscent of those at the White House before the war, they managed a good hand grip and a warm smile even for the last hundred guests. This was one of the perceptive touches that helped them win the approval of even such ordinary individuals as Indian soldiers.

The soldiers who went to a Viceregal reception on the anniversary of the final British success in Burma were further pleased when the Viceroy, who obviously had had little time for language lessons, gave part of his address in Hindustani. Though he read from a romanized script and his accent was somewhat less than perfect, the effort paid dividends.

Similarly, the "Court Circular" which recorded Viceregal actions and visitors changed its tone under the Mountbattens. No longer was it reported that "Her Excellency honored Lady Soandso with her presence at tea." Instead the Circular stated that "Her Excellency called on Mrs. Sarojini Naidu."

Whether India's division into two Dominions is the best solution for the Indian people is too large a question to enter into here. Whatever its merits, and it has many, the astonishing feature of the interparty agreement is that this seagoing admiral, a cousin of the King, who lacks a commoner's experience in parliamentary politics, has fulfilled a political mission of the utmost difficulty and importance. Moreover, he has done it with a speed that would have been unpredictable

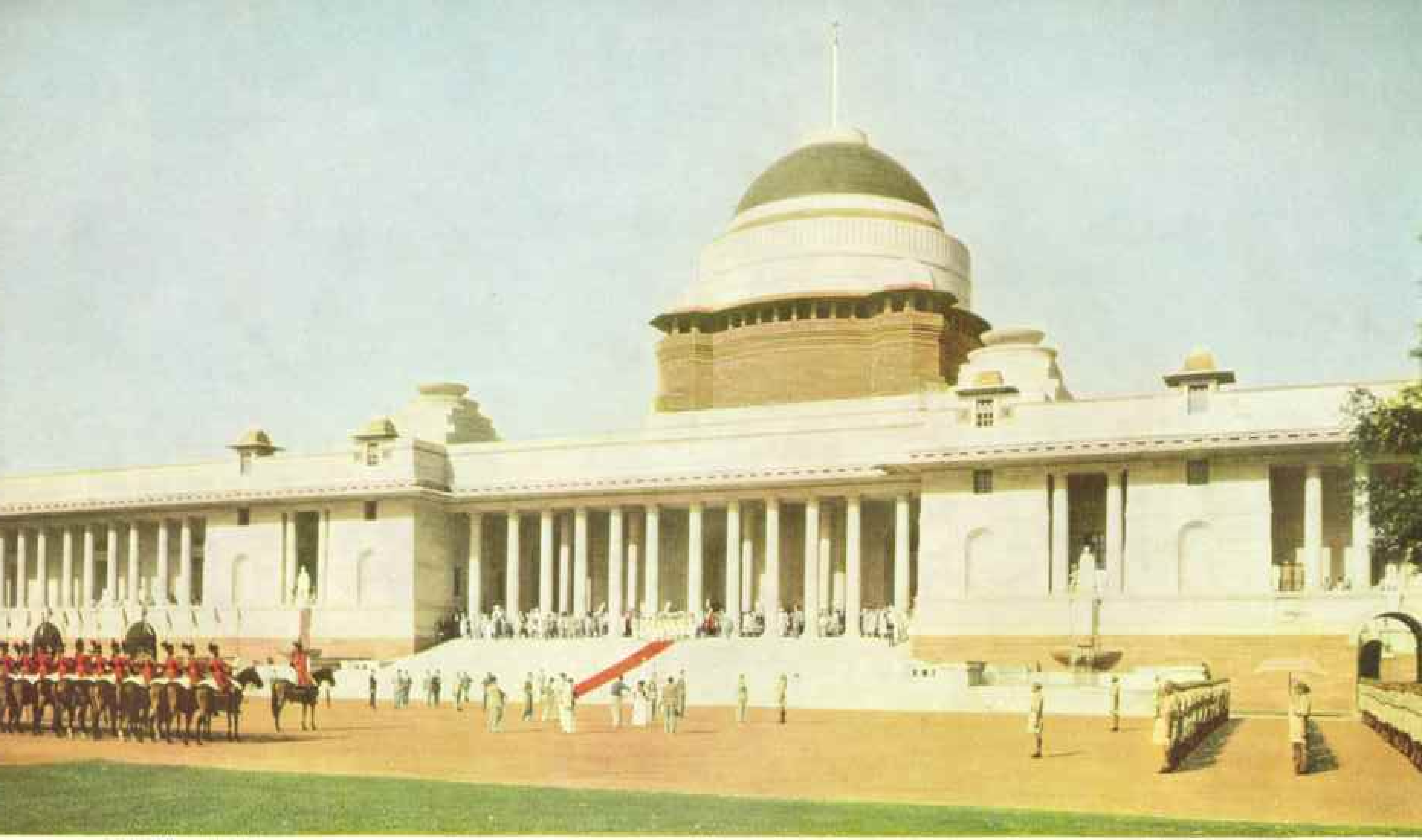


© National Geographic Society

Kodachrome by Volkmar Wentzel

With Pomp and Circumstance the Last Viceroy Starts India Toward Dominion Status

Viscount Mountbatten, taking the oath of office in March, 1947, stands before his throne in the Viceroy's House in New Delhi. Beside him sits Lady Mountbatten. The Viscount (now an Earl) is a cousin of King George VI.



© National Geographic Society

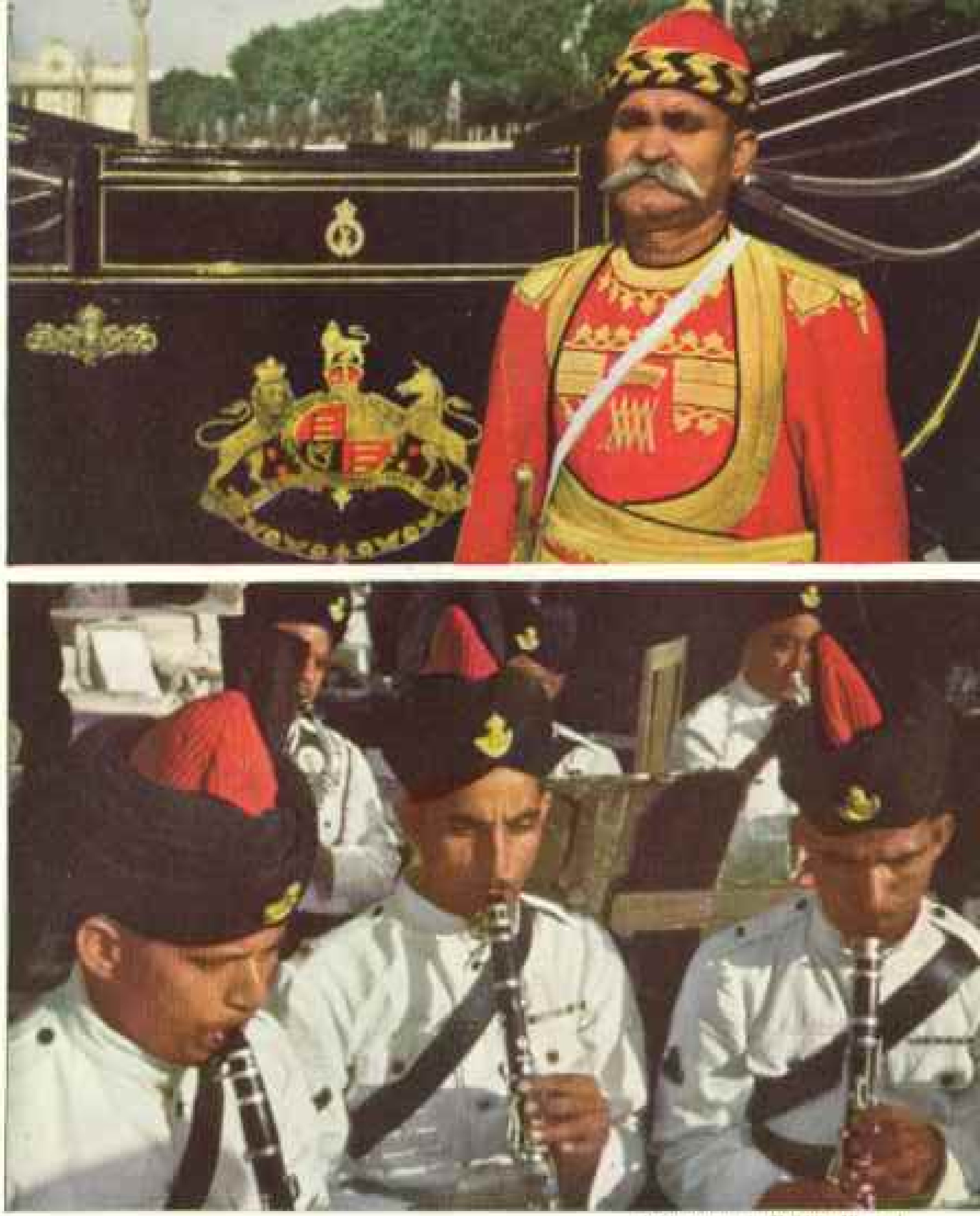
Kodachrome by Volkmar Wentzel

No Longer a Seat of Imperial Might, This Resplendent Palace Remains as the New India's Link with Britain

Cavalry and infantry line up before the former Viceroy's House as Viscount Wavell departs. His successor, Viscount Mountbatten, lives here as Governor-General of the newly created Dominion of India.

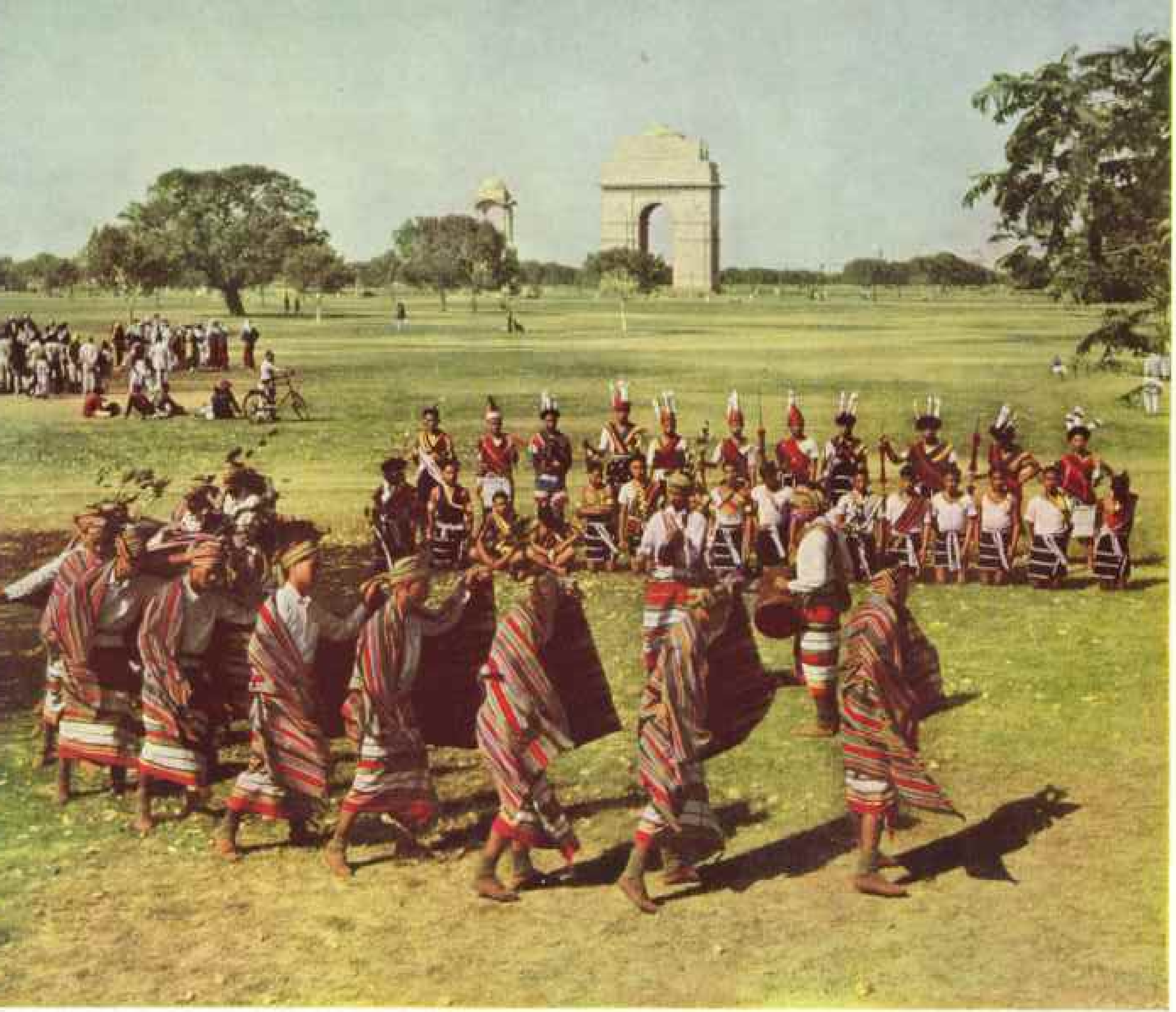
© National Geographic Society

Guarding the King's Representative Is This Indian Lancer's Job



Kodachromes by Volkmar Wentzel

A Band Plays While State Carriage and Footman Wait



Warlike Naga Tribesmen From Assam Dance in a New Delhi Festival

Folk dances by soldiers representing all parts of India featured a festival held in March, 1947, under the sponsorship of Field Marshal Sir Claude Auchinleck, Commander in Chief of the Indian Army.

From the mountain fastnesses of the Assam-Burma frontier came fierce Naga warriors to perform in native costume.

Many Nagas are head-hunters. During World War II the rival tribes ceased this practice to make common cause with the Allies against the Japanese. Recent reports, however, indicate a revival. In February, 1947, Pandit Jawaharlal Nehru announced that the Nagas had taken 315 heads since the end of the war.

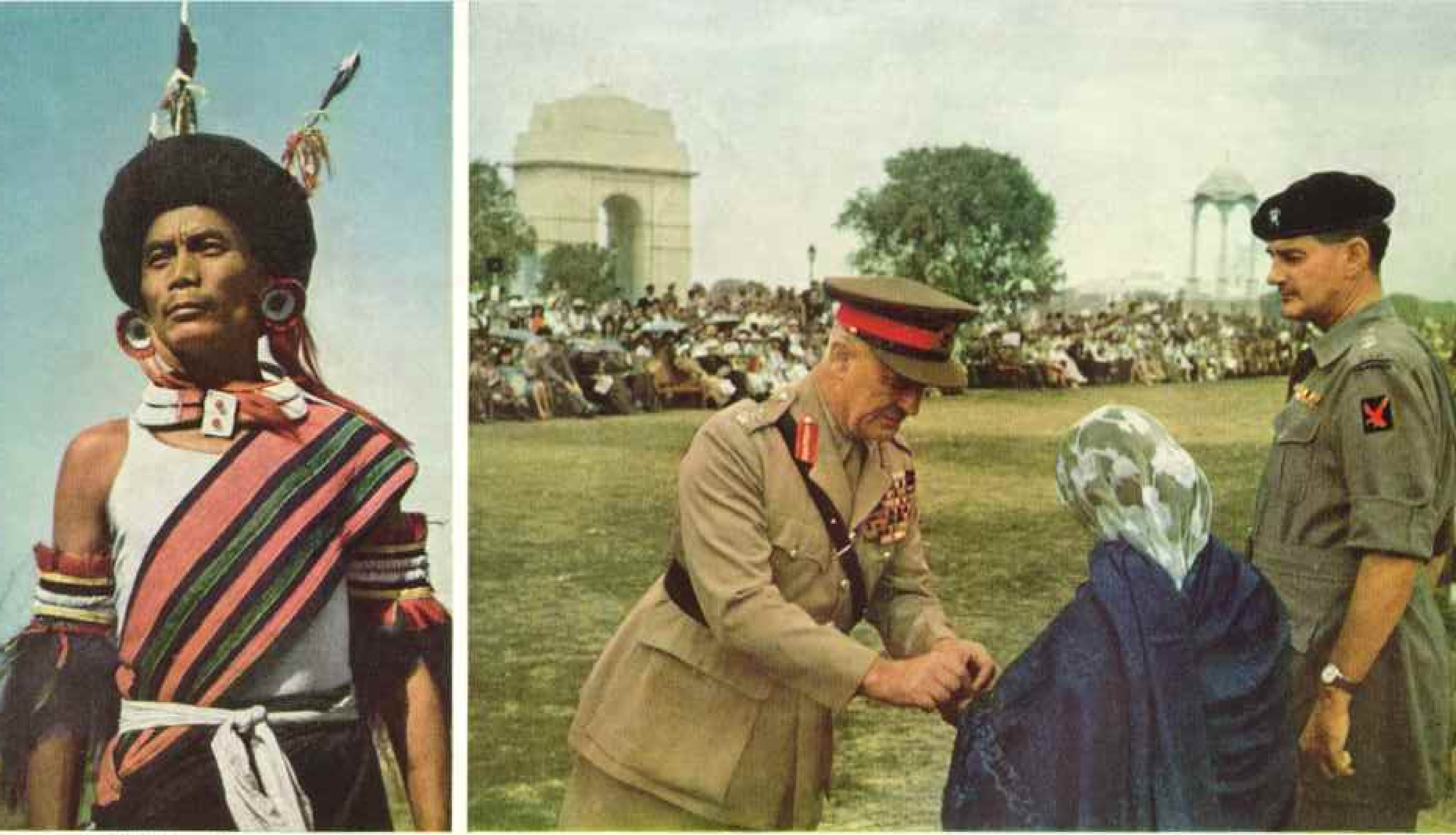
The Nagas gave valuable assistance to the Allies by acting as guides and guerrilla fighters. The Japanese feared their ingenious mantraps, made of spiked bamboo poles.

Many American airmen, forced down while flying the Hump, were rescued and sheltered by the Nagas.

Most of Assam now is a part of the new Dominion of India. The Sylhet district elected to join Eastern Bengal in forming the Dominion of Pakistan.

© National Geographic Society

Kodachrome by Volkmar Wentzel



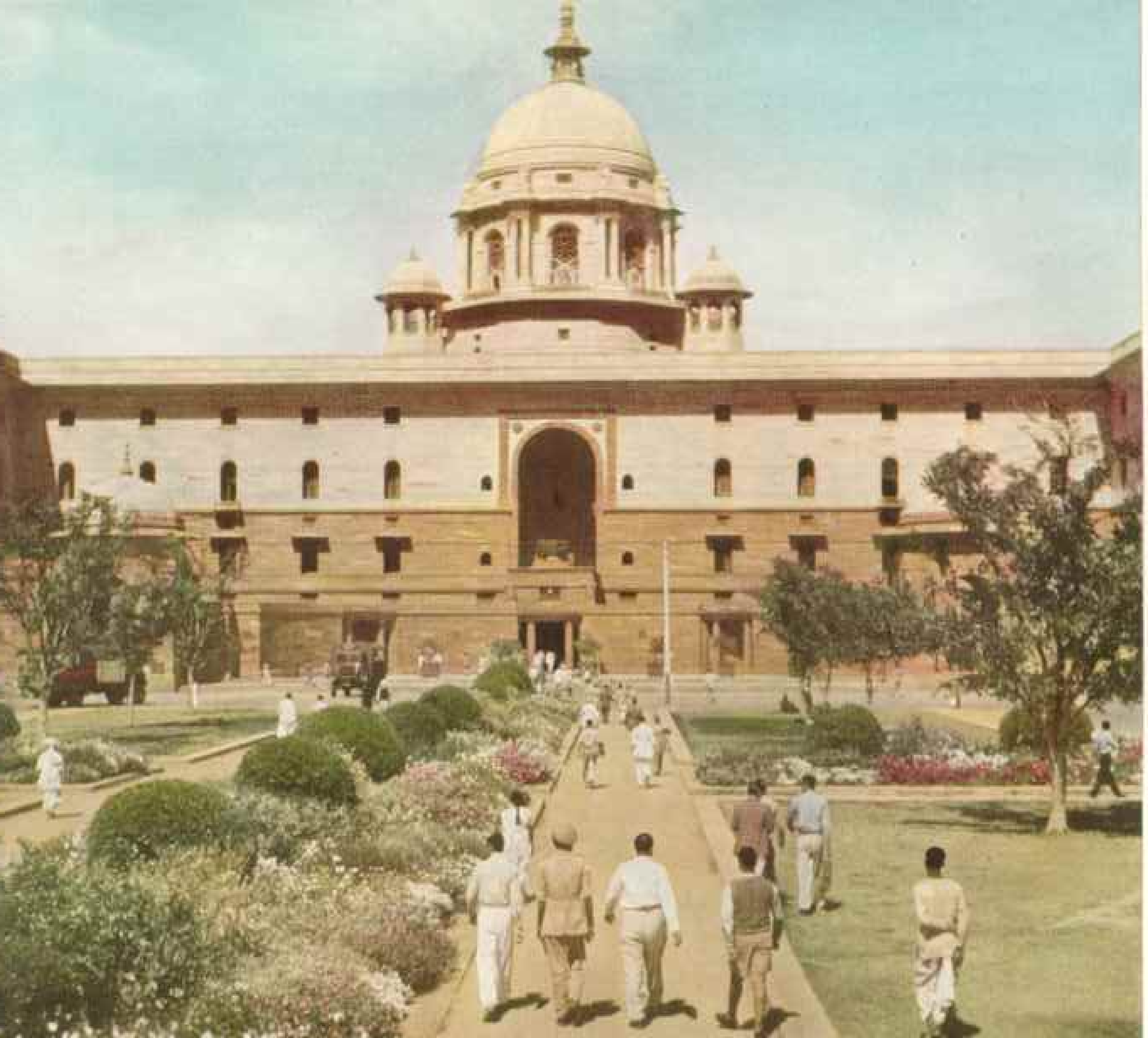
© National Geographic Society

V

Kodachromes by Volkmar Wentzel

Beads and Feathers Adorn a Naga Soldier; an Indian Mother Receives Britain's Tribute to a Heroic Son

The warrior (left) led his tribesmen to New Delhi for a dance festival. Viscount Wavell pins the George Cross on the *sari* of a woman whose son died in the war.



Classical and Indian Designs Merge in New Delhi's Vast Secretariat

Twin office buildings of sandstone and marble, crowning Raisina Hill near the Governor-General's House, sheltered India's governmental machinery under the British Raj and now serve the same purpose under Dominion status. In this view, clerks and visitors approach the South Block of the Secretariat.

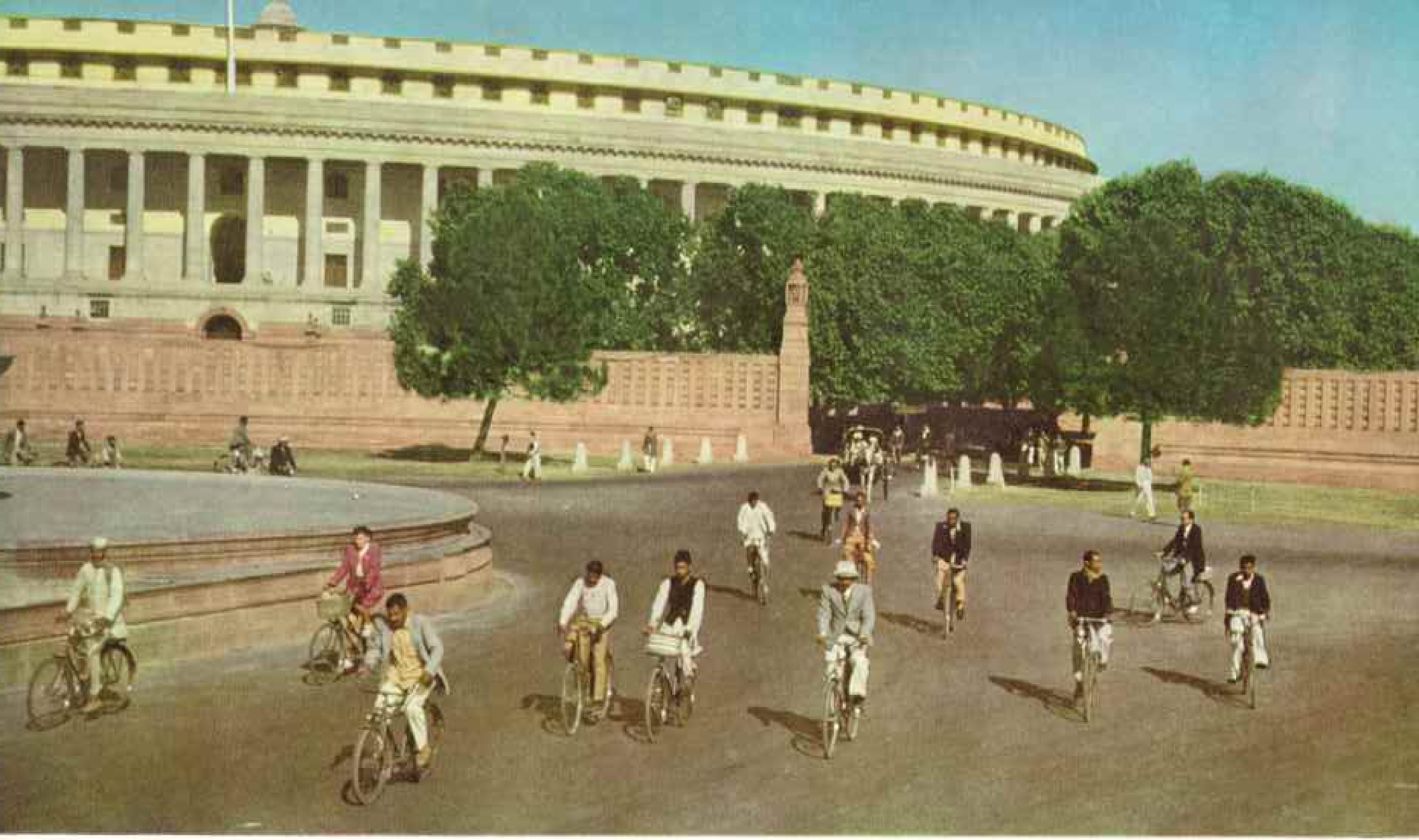
So vast are the Secretariat buildings, and so labyrinthine the arrangement of their interiors, that a trip through them requires a guide for the uninitiated.

Each morning and evening the broad Kingsway and other streets near the Secretariat swarm with government workers on bicycles. To combat New Delhi's summer heat, which often exceeds 110 degrees, straw mats are placed around the Secretariat doors and windows. These are constantly watered.

Designed by Sir Herbert Baker, the Secretariat helps form the centerpiece for an imposing New Delhi built on the site of seven earlier Delhis. The capital's circles and streets, intersecting at sharp angles, suggest the plan of Washington, D. C.

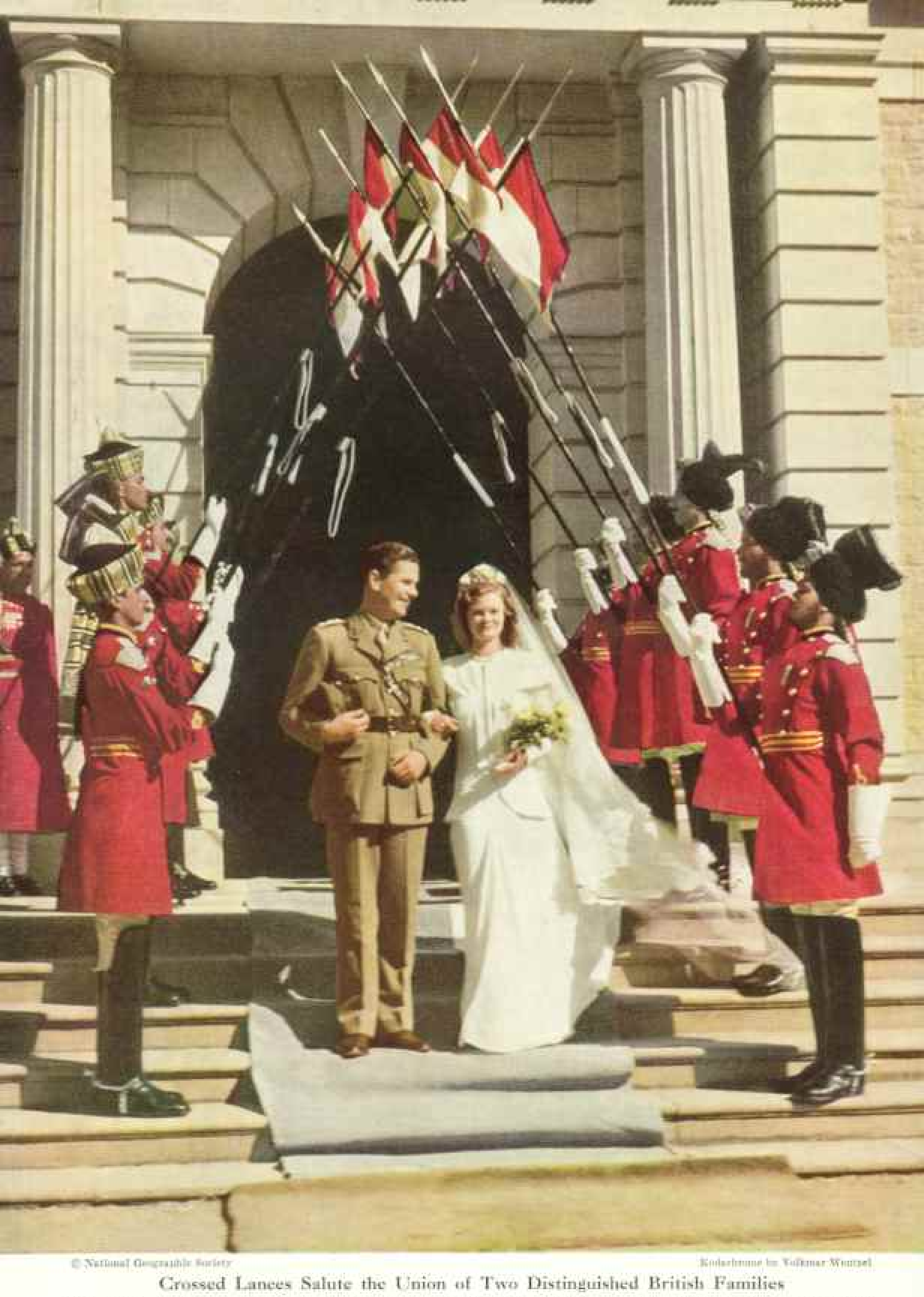
© National Geographic Society

Kodachrome by Volkmar Wentzel

© National Geographic Society

Kodachrome by Volkmar Wentzel

Past the Colonnaded Parliamentary Rotunda, Indian and English Government Workers Cycle to Their Secretariat Jobs

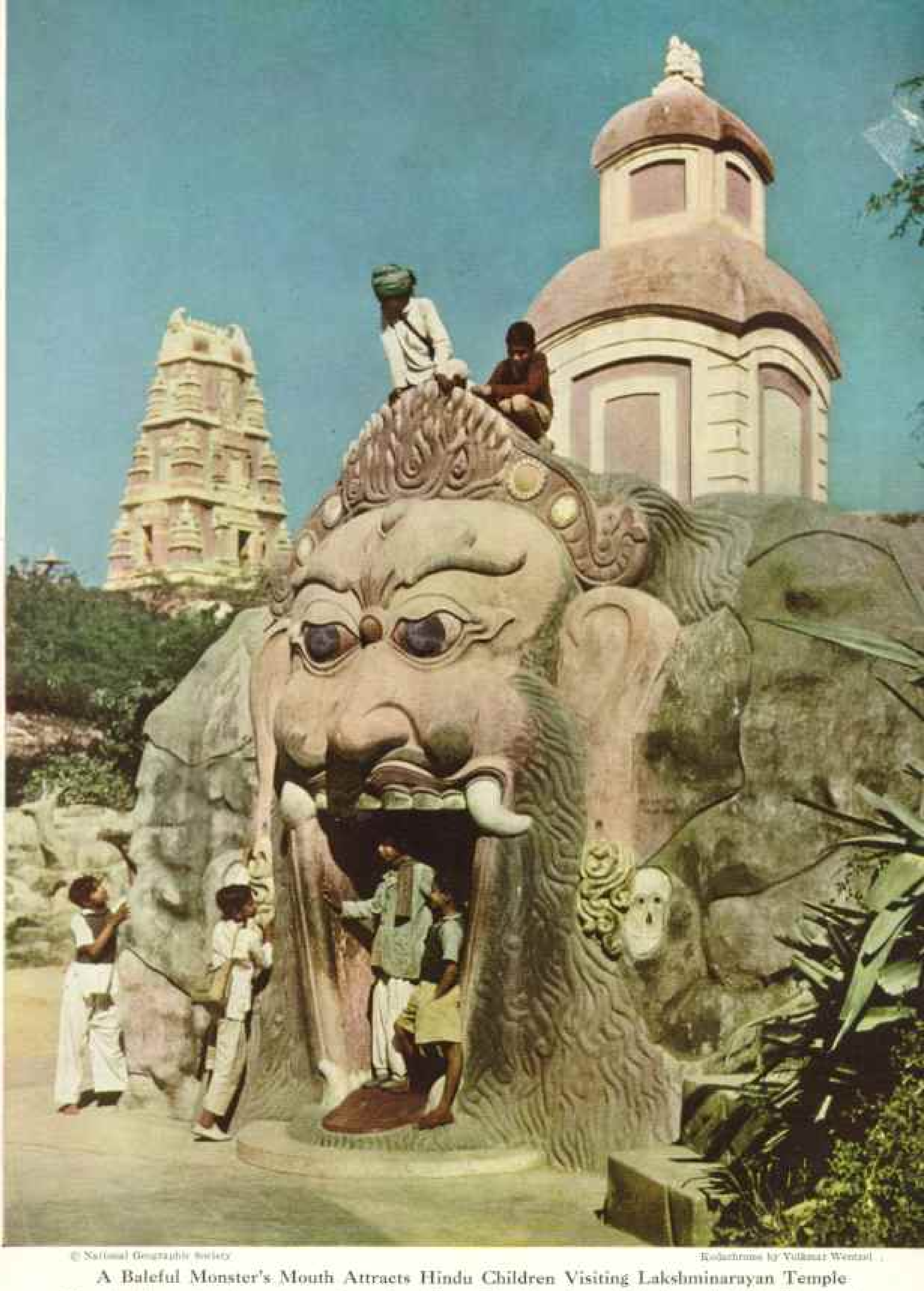


© National Geographic Society

Kodachrome by Volkmar Wentzel

Crossed Lances Salute the Union of Two Distinguished British Families

Capt. Peter Longmore, son of Air Chief Marshal Sir Arthur Longmore, and the former Felicity Ann Wavell, daughter of Viscount Wavell, leave a New Delhi church after their wedding.

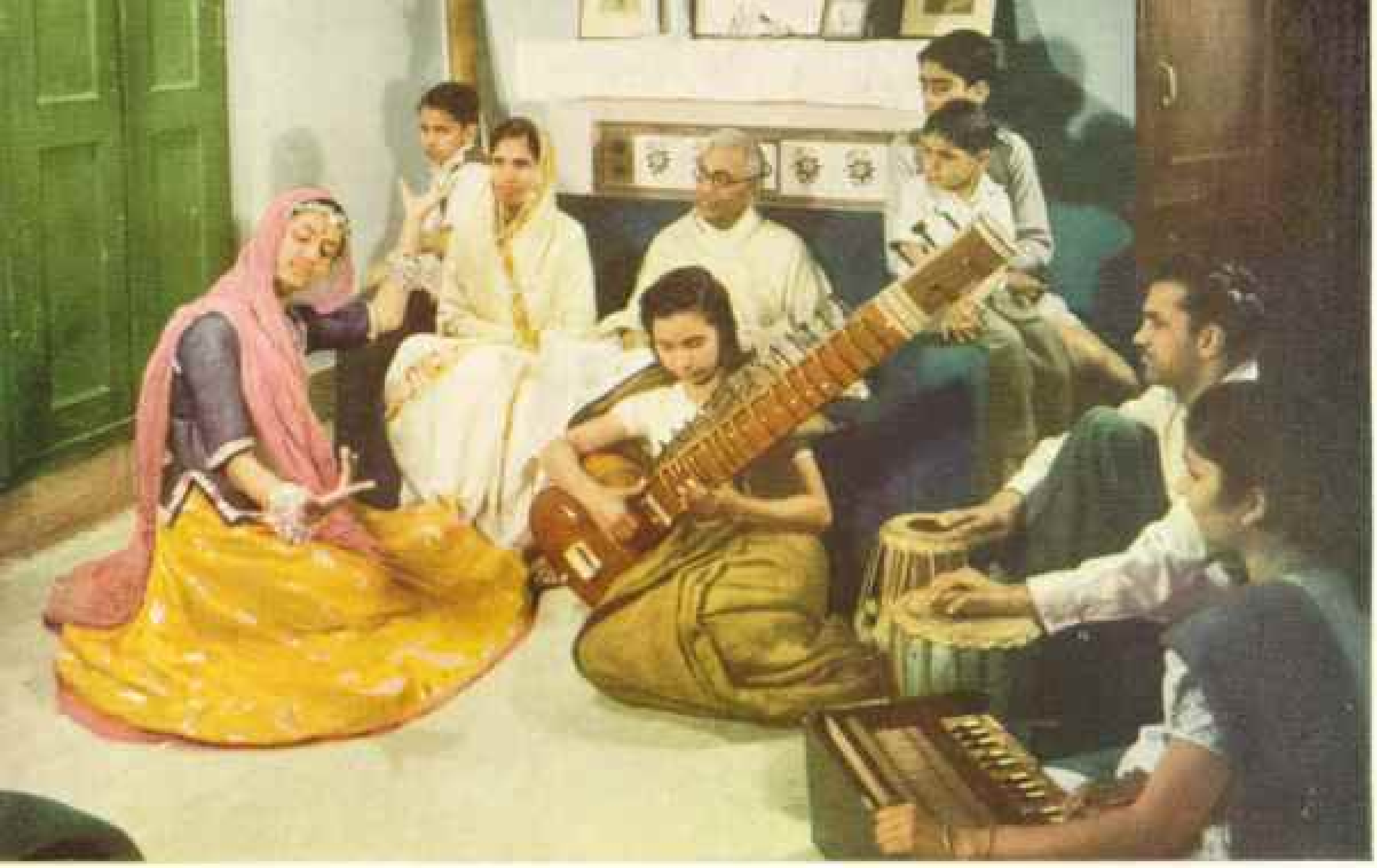


© National Geographic Society

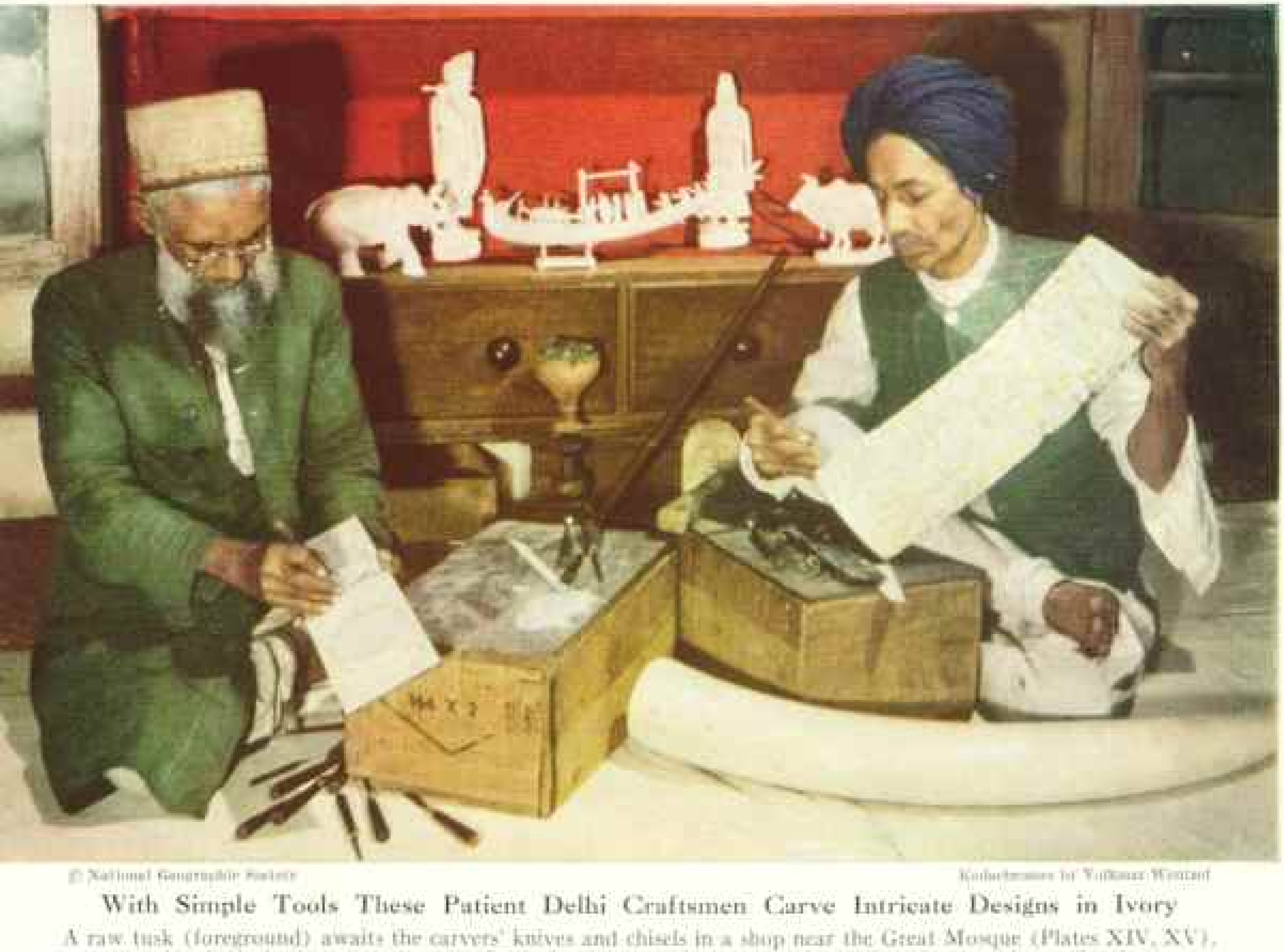
Kodachrome by Volkmar Wentzel

A Baleful Monster's Mouth Attracts Hindu Children Visiting Lakshminarayan Temple

Boys standing on the tongue ignore signs saying "Please Take Your Shoes Off." Also called Birla Temple, after the man whose money built it, this edifice is one of New Delhi's oddest. All Hindus may worship here.



Silvery Tinkling of Bracelets Accompanies Symbolic Hand Gestures in an Indian Girl's Dance

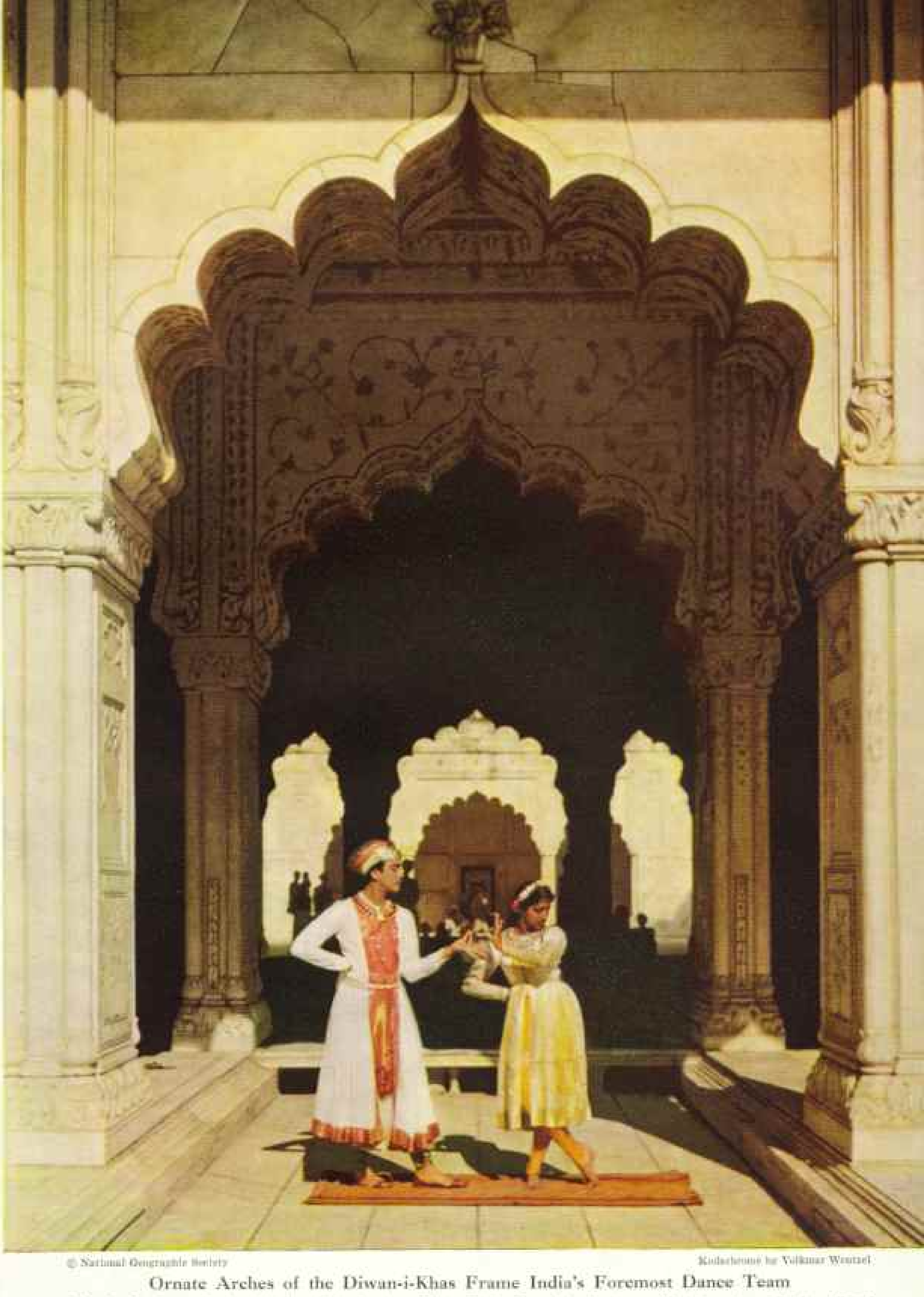


© National Geographic Society

Kodachromes by Volkmar Wentzel

With Simple Tools These Patient Delhi Craftsmen Carve Intricate Designs in Ivory

A raw tusk (foreground) awaits the carvers' knives and chisels in a shop near the Great Mosque (Plates XIV, XV). On the shelf (background) are the finished products—elephant, water buffalo, boat, and two figurines.



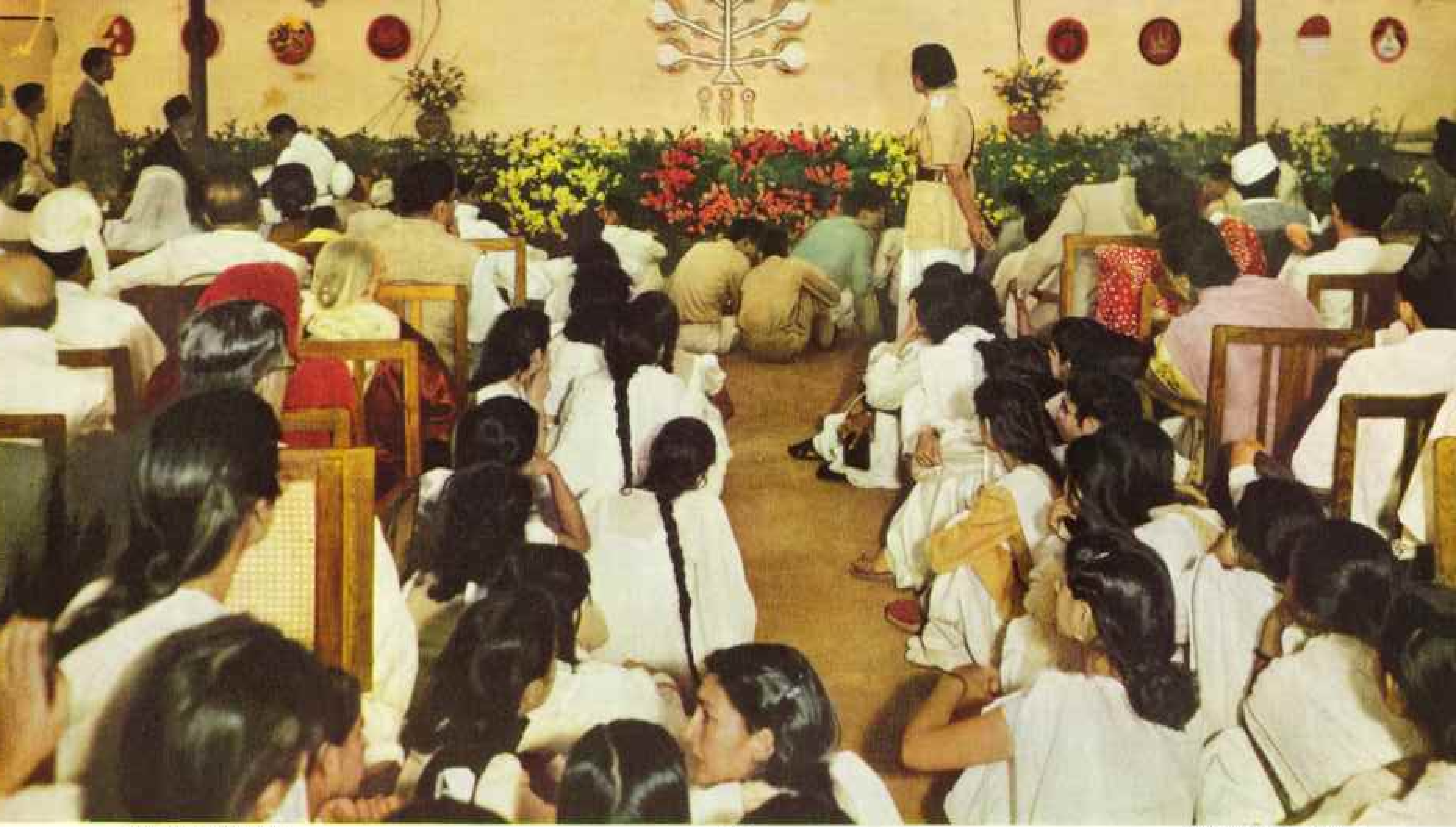
© National Geographic Society

Kodachrome by Volkmar Wentzel

Ornate Arches of the Diwan-i-Khas Frame India's Foremost Dance Team

A leader in the revival of Indian folk dancing (Plate X) is Ram Gopal, here with his partner, Leela. Gopal wears the costume of a Rajput prince. Their graceful hand movements tell a story in rhythm.

CONTINENTS
ASIA
NATURAL RESOURCES



© National Geographic Society

XIII

Kodachrome by Volkmar Wentzel

Spokesmen for Half the World's Population Exchange Ideas at the Inter-Asian Relations Conference

Twenty-eight countries were represented at this New Delhi meeting in the spring of 1947. Speakers called for Asiatic unity in "one world."

A Monument to Shah Jahan, the Builder, Is Delhi's Great Mosque

Viewed from the Lahore Gate of Delhi's Red Fort, the bulbous domes and slender minarets of the Jama Masjid, or Great Mosque, rise in the distance like a dream picture in sandstone and marble.

One of the world's largest mosques, Jama Masjid is to Moslems in India as the Basilica of St. Peter's is to Roman Catholics. One prayer here is counted as equal to 25 at home or in a lesser mosque.

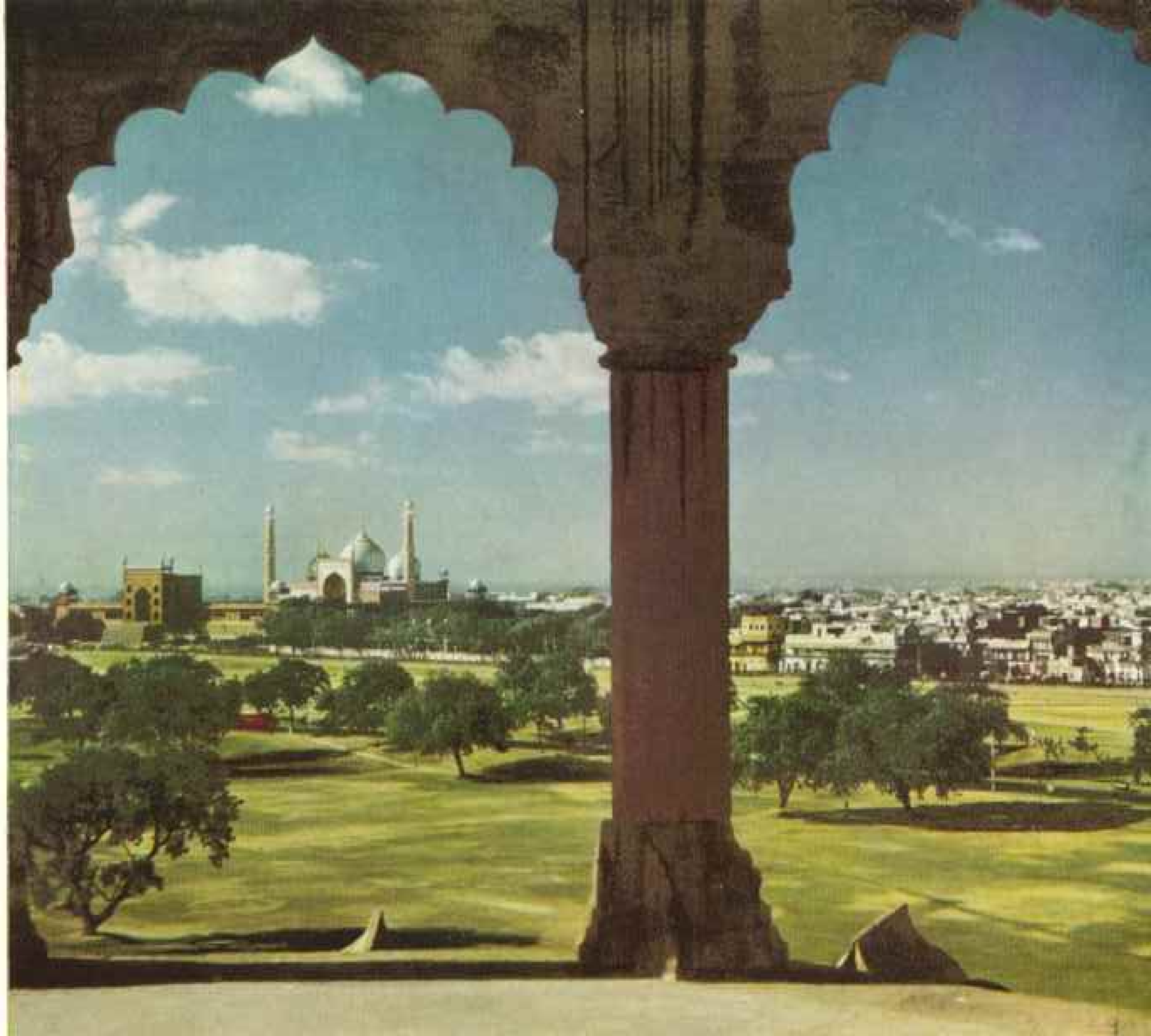
In the close-up view, thousands bow toward Mecca in noontime prayers in the courtyard before the Great Mosque's façade. Much larger throngs assemble here for services launching the Id festival, at the end of the fasting month of Ramazan, and on other important days of the Moslem calendar.

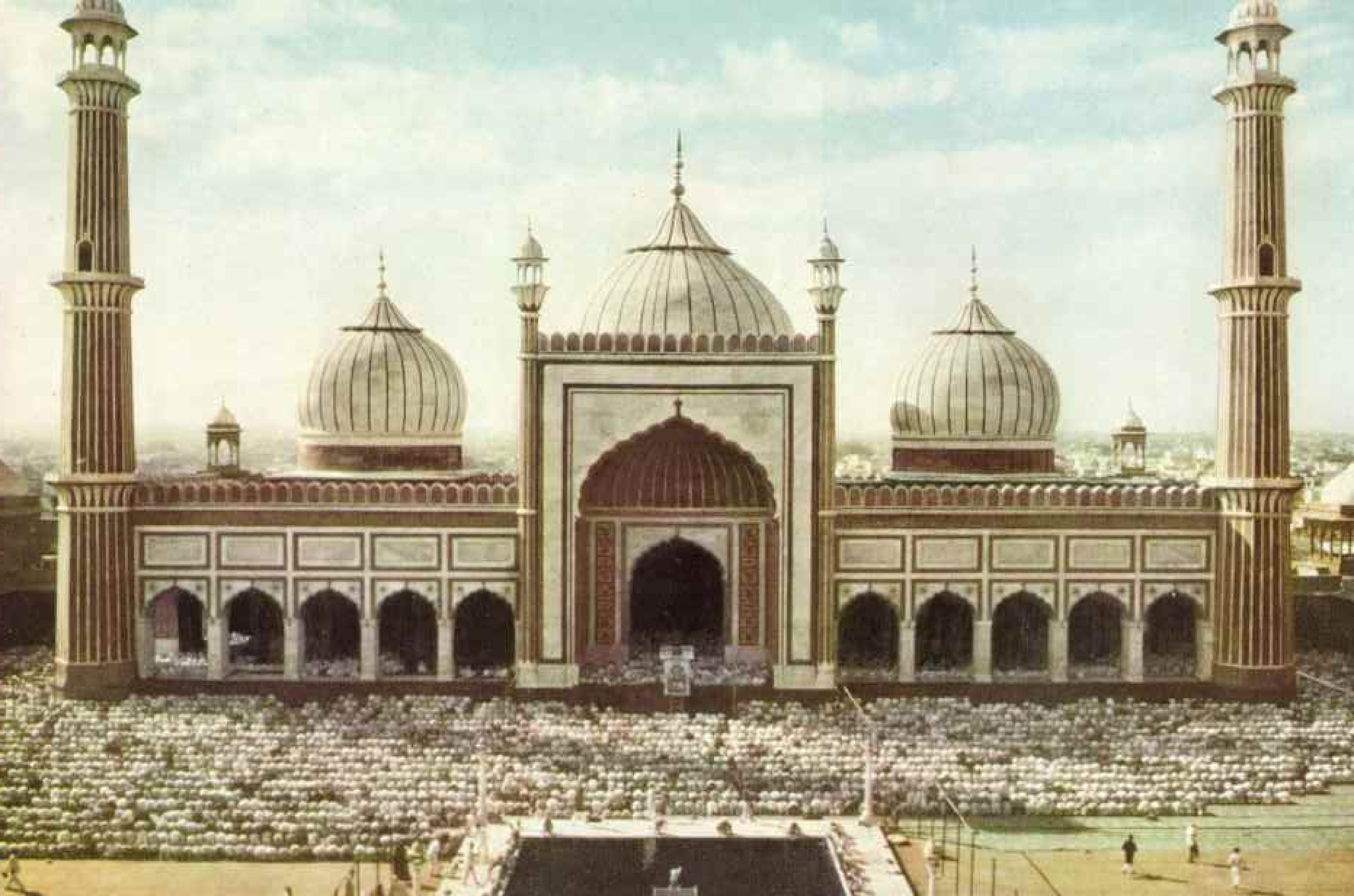
Construction of the Great Mosque began in 1644, under the reign of the Mogul Emperor Shah Jahan, and occupied 5,000 workmen for six years. Long flights of stone steps lead to its three gateways.

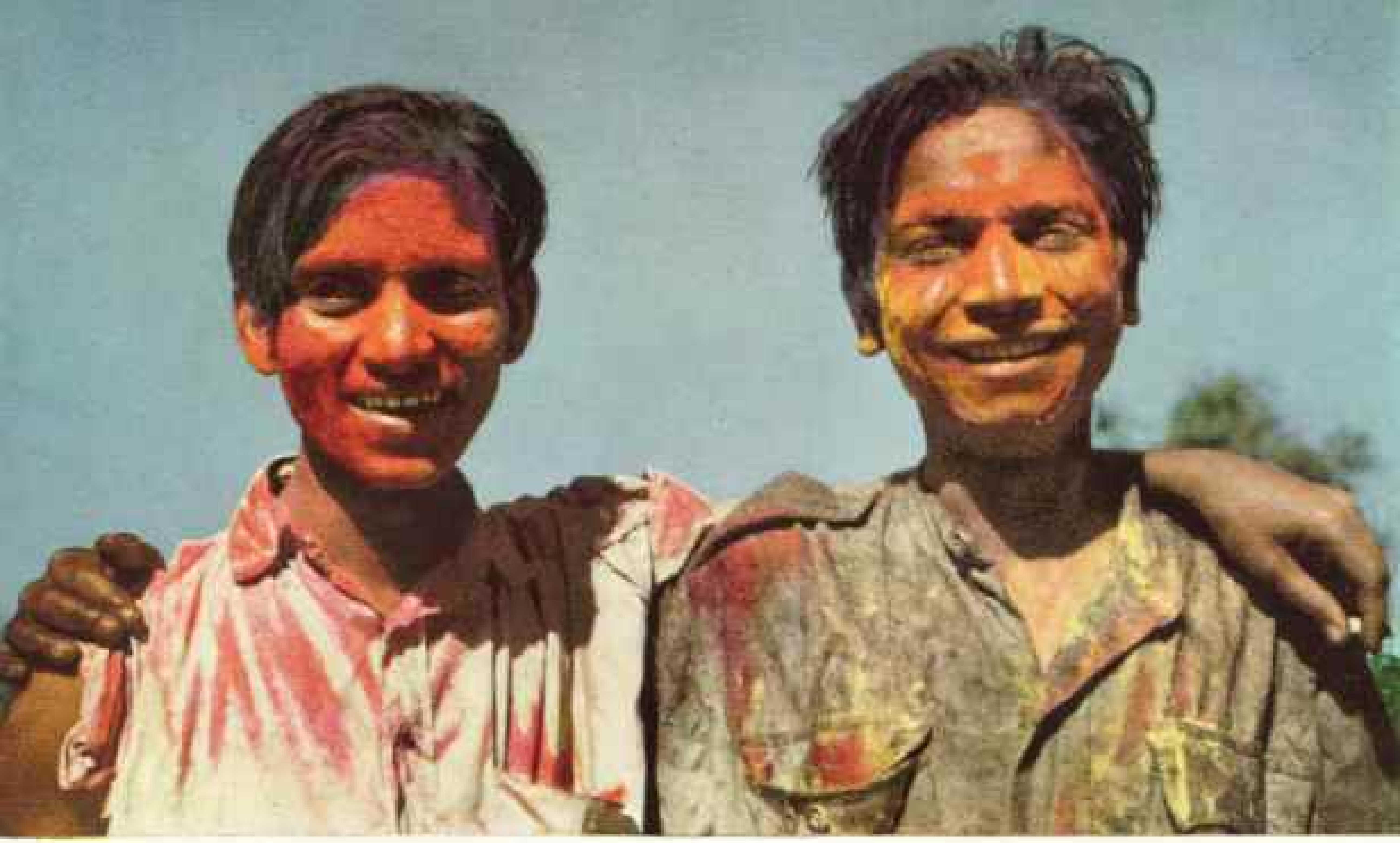
Preserved in the mosque are relics of the Prophet Mohammed, including a hair from his beard, his sandal, and the imprint of his foot in stone.

© National Geographic Society

Kodachromes by Volkmar Wentzel

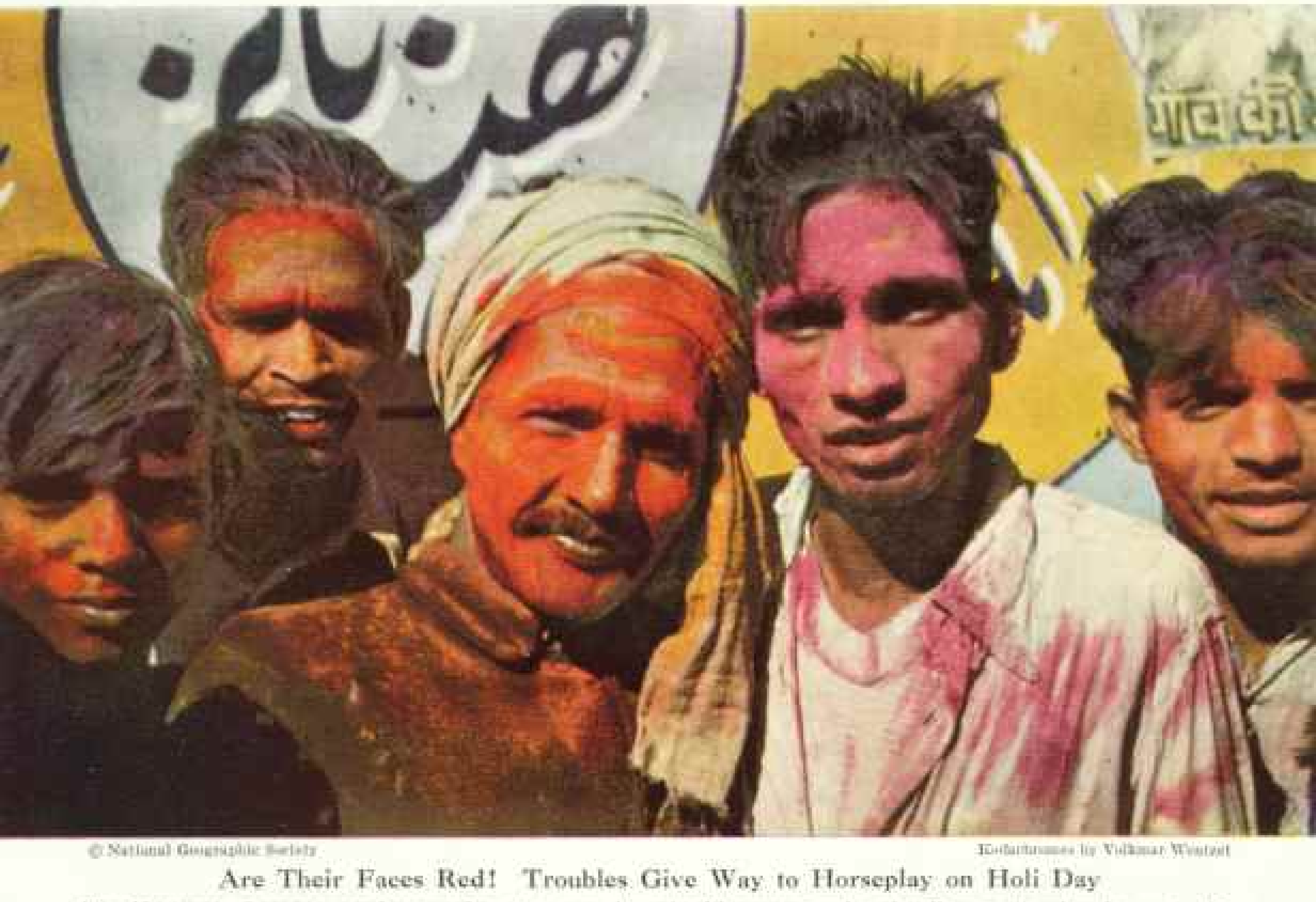






Red and Yellow Hindu Faces Herald Spring's Advent in India

These Delhi youths have been celebrating the boisterous *Holi* festival, which usually takes place in March in honor of the Lord Krishna. Men and boys spray one another with colored water and powders.



© National Geographic Society

Kodachromes by Volkmar Wentzel

Are Their Faces Red! Troubles Give Way to Horseplay on Holi Day

The NATIONAL GEOGRAPHIC photographer, too, was doused with watery red and yellow paste when he made this picture in Delhi. Many Hindus use water guns in good-natured battles.

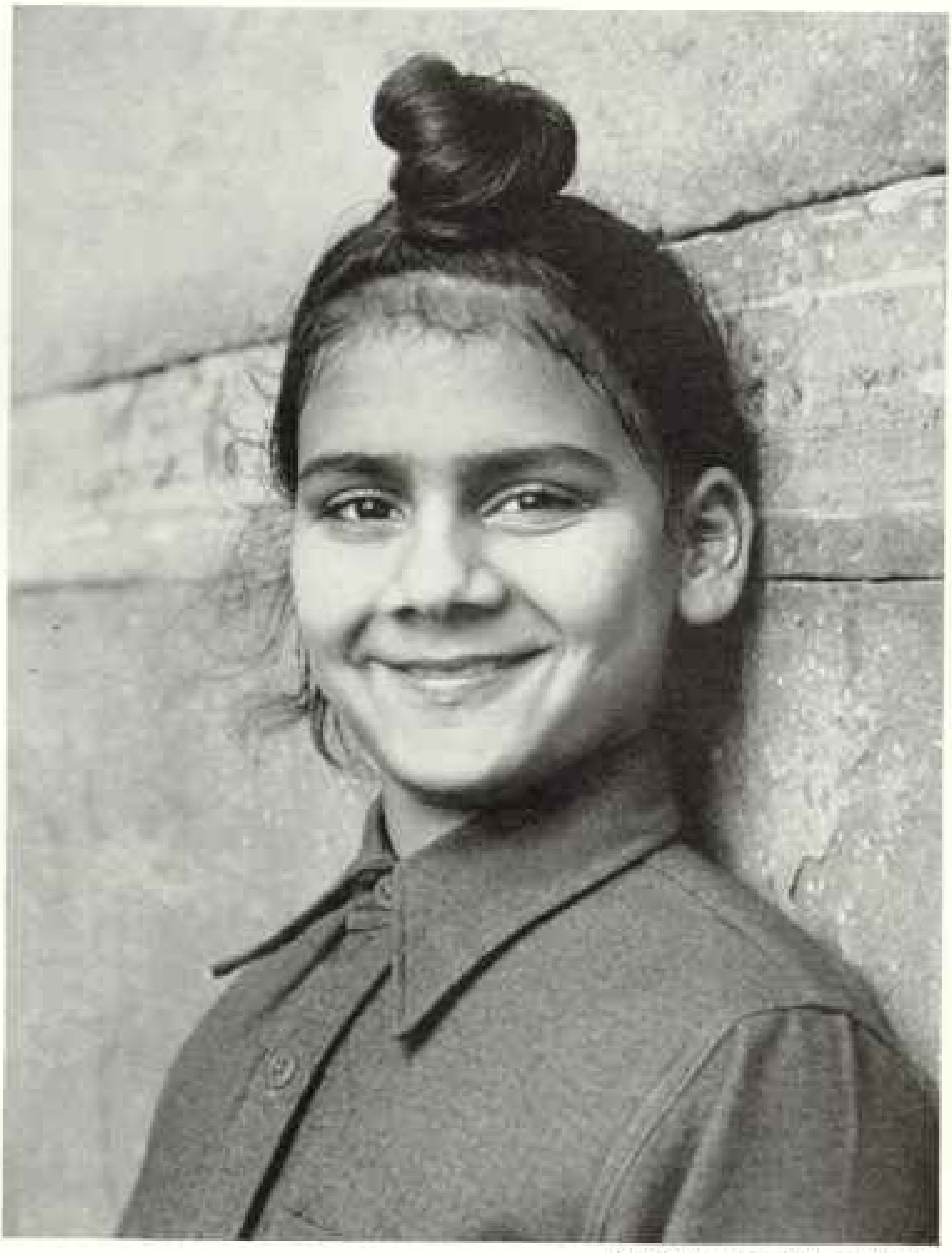
a few months ago. His reward is an earldom.

Over the seat of government at Delhi now floats the flag of the new Dominion, bearing the symbolic wheel of Asoka, Indian sovereign who reigned two and a half centuries before the time of Christ (page 601). Pakistan's green-and-white flag bears the star and crescent of Islam.

Many Monuments of Moslem Origin

By Indian standards, many historians suggest, Delhi is a modern town. The records of its continuous existence go back only a thousand years. Story and tradition, however, ascribe to it an age stretching into the legendary past, to the days of a city called Indraprastha perhaps 35 centuries ago.

No one knows how many cities there have been on the site of Delhi. Even in recorded times the "seven cities of Delhi," according to authorities, were only a fraction of the number that really existed. British New Delhi, therefore, is not the eighth but the umpteenth city on this strategic spot.



Staff Photographer Volkmar Wentzel

A Rare Sight Is a Sikh Without His Turban

His religion forbids appearing bareheaded in public, but in his Delhi home this boy unwound yards of cloth to display the characteristic Sikh topknot. The *Granth*, or Sikh Bible, also bans haircuts or trimming of beards.

Not counting the nearly 2,200-year-old edict-bearing Asoka Pillars, which were brought to Delhi centuries after they had been erected for the guidance of the people of the realm, or the equally famous rustless Iron Pillar of the 4th century after Christ, Delhi's monuments are largely of Moslem origin. Islamic rulers and their ministers were the builders from the time of Kutb-ud-Din Aibak in the 12th century.

They have left behind them a majestic array of forts, palaces, tombs, and other structures, strewn between the Jumna River and the Ridge for a distance of more than 12 miles and largely in ruins. One of the earliest of them is also one of the most spectacular. This is the Kutb Minar, a lofty unattached tower that stretches 238 feet into the sky for the glory of Allah.

From the Kutb one can follow the track of history through the remnants of Tughlakabad, Jahanpanah, Siri, the Hauz Khas (originally a reservoir), and along to the Lodi Tombs, in today's New Delhi.

Four centuries ago the emperors Humayun and Sher Shah built what is now called the Old Fort, or Purana Kila. Within its walls Asia's past met its future last spring when the Inter-Asian Relations Conference attracted delegates from many countries, testifying to the reawakening of the world's largest continent (Plates XII-XIII).

National Geographic Society U.S.A.

Staff Photographer Volkmar Wentzel

Around The Society's Photographer Swarmed Children and Sacred Cows

The name of the National Geographic Society is painted in English, Hindi (left), and Urdu (right) on the car used by Volkmar Wentzel in his extensive photographic survey of changing India. An outline map of the great subcontinent is also painted on the side of the vehicle, a former ambulance which had seen service on the Stilwell Road in Assam. The dusky children and snowy cow formed an informal reception committee in a village just across the Jumna River from Delhi.

The shell of yet another Moslem city, Firozabad, rests by the road leading to the splendid capital of Shah Jahan, the Mogul who "found India in red stone and left it in marble."

The unforgettable Red Fort (Lal Kila), guarded Shah Jahan's Delhi palace. Here was the Peacock Throne made of gold and precious jewels. Here remain the Pearl Mosque of Aurangzeb, formal gardens cooled by gamboling fountains and trim watercourses, marble audience halls, and the inscription bearing the Mogul's joyous chant: "If there be Paradise on earth, it is here, it is here, it is here."

From Purdah to College

So richly endowed is Delhi that the monuments of the past are far from being its only glory. If it lives in the shadow of history, it is also illumined by the beacons of science and education.

Today's scholars can look for inspiration to the oddly futuristic patterns of the 212-year-old Jantar Mantar, a group of giant structures with which a Jaipur astronomer accurately measured the movement of stars and planets.

Under government patronage, science has continued to find a place in Delhi. Medical facilities, for example, equal to any in India are found in three hospitals named after former Viceregal families, Hardinge, Irwin, and Willingdon.

New Delhi's College of Nursing, established with advisory assistance from the Rockefeller Foundation, gives a four-year course to girl students, some of whom have reached the college directly from the shy seclusion of *purdah* (page 605).

In another field, the Malaria Institute of India works at one of the scourges of the country, while national scientific laboratories are due to begin soon their important work.

Colleges likewise flourish as the Delhi University advances the cause of solid scholarship under its respected British Vice-Chancellor, Sir Maurice Gwyer, retired Chief Justice of India. Thus the cultural life of Delhi keeps pace with the modern world.

This is a year of many changes for Delhi. New faces are appearing with new sanctions for power. As old ones leave and new ones arrive, however, Delhi goes on, conscious of its destiny and confident that in the future as in the past no ruler of India can afford to ignore it.

Yemen—Southern Arabia's Mountain Wonderland

By Harlan B. Clark

"INSHALLAH—if Allah is willing—you can make the journey," the bearded Arab emissaries of the Imam Yahya, priest-king of Yemen, gently replied when I told them I should like to visit His Majesty in his capital, high in the mountains of southwestern Arabia.

We were speaking in the American Consulate in the British colony of Aden, Arabia, where I was then serving as consul of the United States. I knew that in this polite manner my dignified guests were saying that they would report my wishes to their sovereign and let me know his pleasure in due course.

Aden, a strategic prize of the seaways through the centuries, seems to belong more to the tempestuous seas than to the brooding hinterland behind it.*

But not so. Aden is an ancient gateway to the wonderland now known as Yemen, once famous for other ports, such as Mocha on the Red Sea, and even more so for the flourishing centers of population and culture on its mountain plateaus (map, page 634).

Some of these cities, like its present capital, San'a, still flourish with traces of their bygone splendor; others, such as fabulous Marib, lie moldering in the shifting sands that cover vast areas formerly green with crops watered from mighty dams.

The rulers of Marib, capital of Saba, as Yemen was then known, were monarchs whose sway at times extended over much of the Arabian Peninsula and probably over part of East Africa as well.

Land of the Queen of Sheba

Out of their wealth the kings of old Yemen built huge irrigation dams and supported a civilization in which trades and the arts attained a high order, and one of the earliest written languages recorded the Arabian monarchs' prowess and devotion to their gods.

When the Queen of Saba, or Sheba, as we now call it, paid her celebrated visit to King Solomon, she probably saw few wonders in the north that her southern realm could not equal in majesty.

Sculptured and inscribed stones in some of the ancient palaces and many-storied "skyscrapers" still to be seen in Yemen bear mute testimony to the vanished glory of the Sabaean, Minaean, Himyaritic, and other civilizations which succeeded them.

But the overland spice routes had their day, and, once the Red Sea routes were opened up for peaceful commerce, the source of the old Yemen's wealth was shut off.

The great Marib dam went untended and finally burst in a disastrous flood about the middle of the fifth century after Christ. The Yemen kings henceforth ruled their shrinking domains from other capitals to the west, finally centralizing their power at San'a.

Although Yemen today is a nation of perhaps 4,000,000 people occupying some 75,000 square miles, not many Westerners know more of it than that the Romans called it Arabia Felix—"Happy Arabia."

From the country's high plateaus come sheep and goat skins, and from its steep valleys the rich coffee to which the port of Mocha gave its name before it, too, fell into disuse.

Yahya Has Ruled for 43 Years

The present Imam, Yahya bin Mohammed bin Hamidadin, succeeded his father in 1904, and by steadfast endeavors won from the Turks a large measure of autonomy before World War I. When they withdrew after the war, he ambitiously set out to win back the ancient domain his ancestors once ruled.

His claims clashed both with those of the British to the south, whose legal position in the Aden Protectorate had been formally acknowledged by the Turks as early as 1902, and with those of King Ibn Saud to the north, who had annexed certain provinces disputed by the Imam.

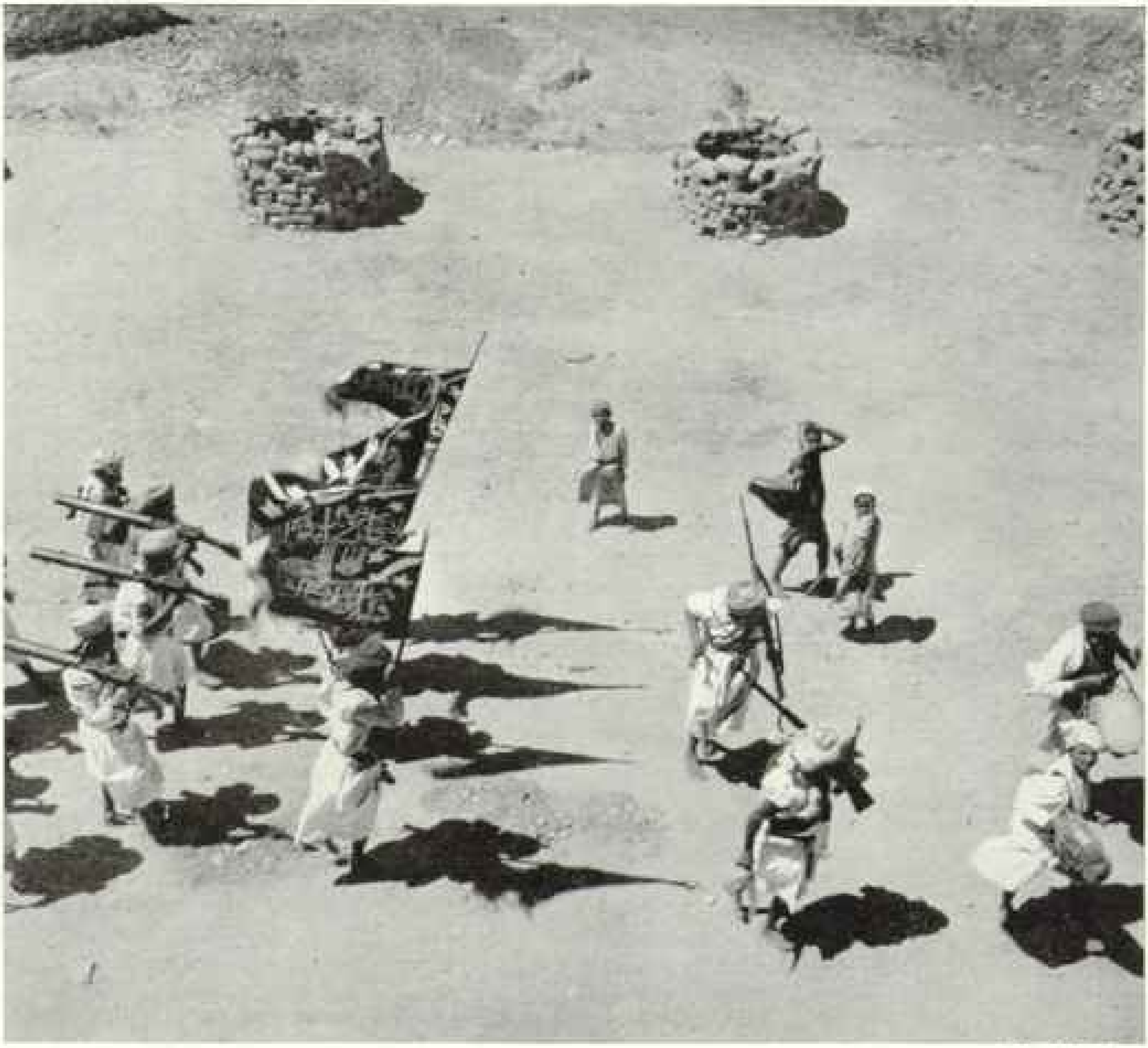
Intermittent warfare prevailed on both these borders until 1934, when Yemen entered into treaties with Saudi Arabia and Great Britain regulating the contested northern and southern borders of Yemen.

By the Treaty of San'a in 1934 the British for the first time recognized the independence of Yemen, and when World War II broke out the Imam had treaties with nearly all the leading powers except the United States.

Relations between the United States and Yemen have been conducted on a friendly but informal basis through the American Consulate at Aden, and in 1928 Vice Consul James Loder Park made a goodwill visit to San'a, where he was cordially received by the Imam.

---

* See "Rock of Aden," by H. G. C. Swayne, National Geographic Magazine, December, 1935.



Alfred M. Palmer

Singing in High-pitched Falsetto, Parading Troops Perform the Dagger Dance

The ritual, for the author's benefit in Ta'izz, interrupted the procession returning the Crown Prince from his weekly visit to the mosque. Led by an Arab band and more than 200 barefoot soldiers, the parade included a troop of racing camels with saddle blankets of vermilion. Cavalry with large black standards preceded the Crown Prince's station wagon, the only modern note in an *Arabian Nights* scene (page 644).

The last previous visit by an American official was that of Charles K. Moser, American consul at Aden, who went to San'a in 1910, while Yemen was still under Turkish rule. Mr. Moser broke his leg riding across the Tihama, the low, semidesert coastal belt. He set the bones himself and rode on without medical care until he reached the coast.

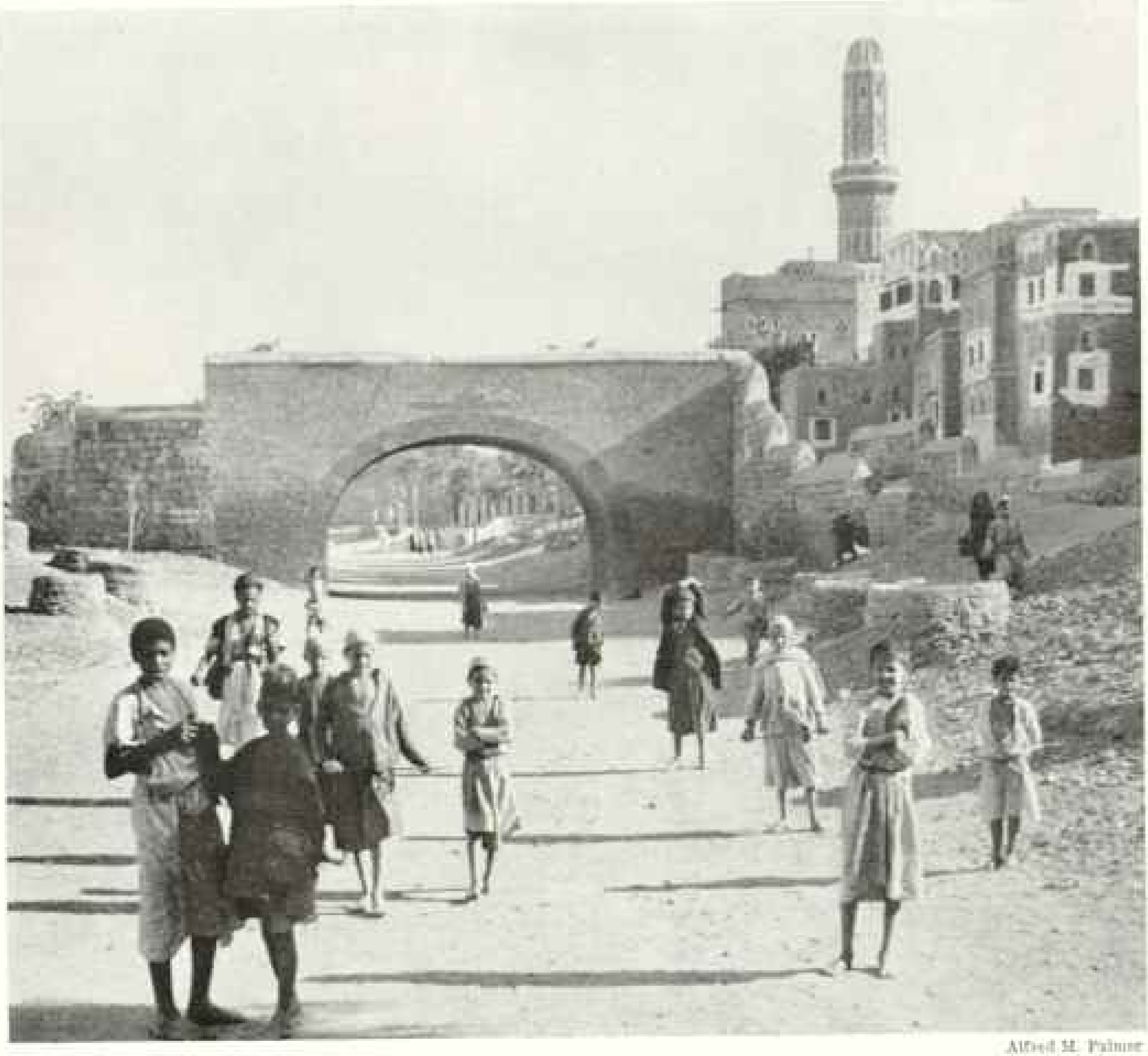
Charles R. Crane Aided Yemen

Other Americans have visited Yemen, notably the late Honorable Charles R. Crane,* who was greatly interested in the country and arranged with the Imam for the sending of American engineers to survey roads and to install new windmills and other equipment which he presented to the Yemen Government.

During World War II Yemenis in the United States served with our armed forces and on American vessels, and a few gave their lives for our country. I was asked to present the Purple Heart to the mother of one Yemeni who had died heroically in the North African campaign.

Desiring to learn more about this country which had long been informally included in the Aden consular district, I obtained the approval of the State Department to pay an informal visit to Yemen and set about making arrangements to go to San'a.

* Charles Richard Crane (1858-1939) was formerly president of the Crane Company, of Chicago. He served on President Wilson's special diplomatic commission to Russia in 1917, in 1919 on the American commission on mandates in Turkey, and as American Minister to China, 1920-21. In 1926-27 he personally visited Yemen.



Alfred M. Palmer

When Flood Waters Fill This San'a Street, Pedestrians Cross on the Arched Bridge

After rains, torrents rush down the mountains. San'a's regular water supply is plentiful, for a stream runs across the plain in wet weather. Many homes have their own wells (page 643).

Through the two emissaries of the Imam I sent word to their sovereign that I should like to bring with me Comdr. Alfred Monroe ("Monty") Palmer, USNR, who was then in charge of the U. S. Armed Guard Dispensary at Aden.

Dr. Palmer, who had traveled extensively in the Aden Protectorate, would be most helpful should members of our party fall prey to malaria, typhus, typhoid, or other diseases.

Early in February, 1945, I received from Crown Prince Saif al-Islam * Ahmed, who rules over the southernmost province of Yemen, a letter sealed with the triangular royal signet of Yemen in red ocher, after the manner of the Himyaritic kings of old Arabia Felix. In courteous and flowery language the Prince, on behalf of his royal father, extended a welcome to me and my party.

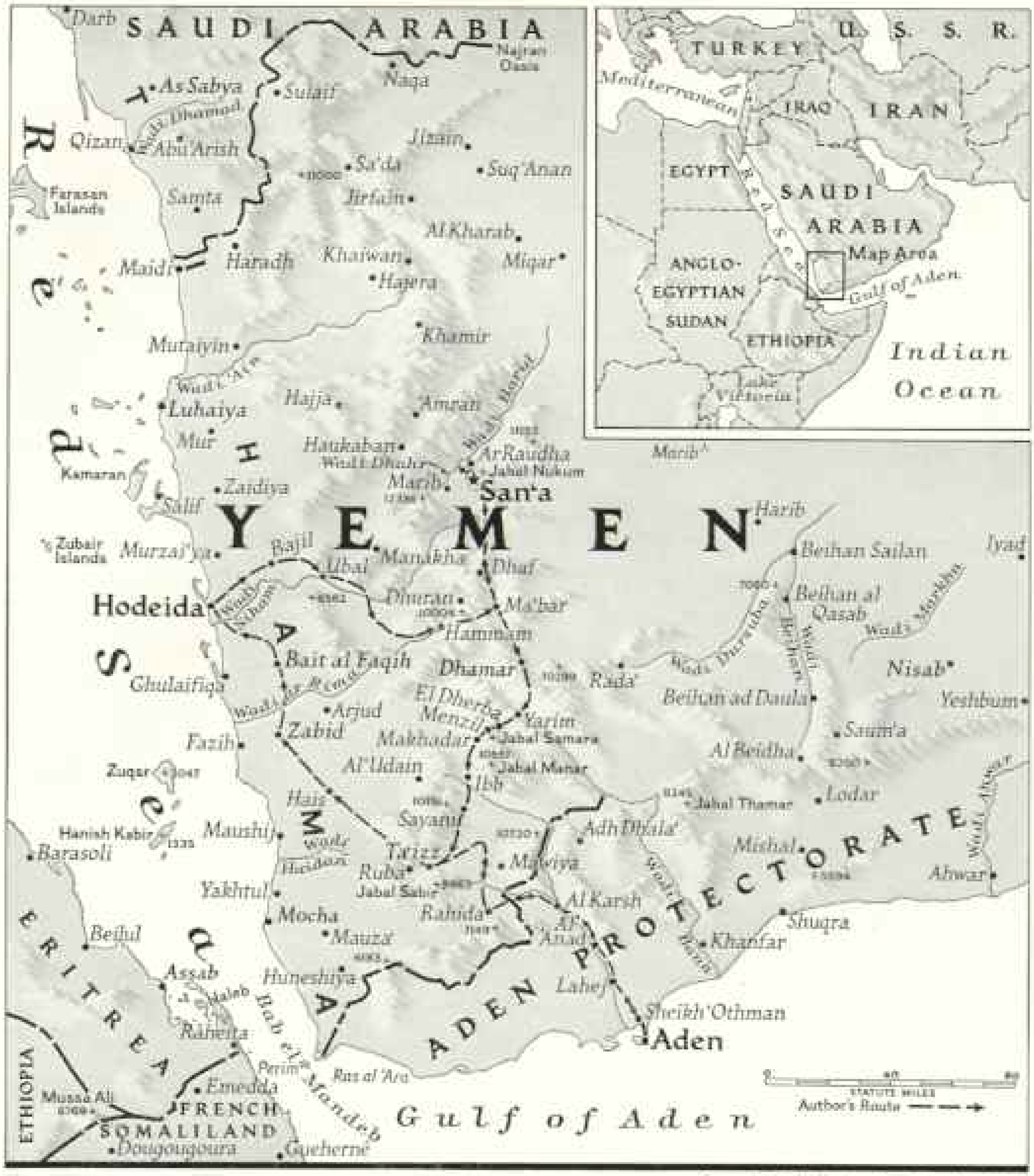
Monty and I obtained the loan of a jeep and an Army-type carryall truck and trailer from the U. S. naval observer. In a few weeks we assembled camping equipment, canned foods and fruit juices, heavy clothes for the high Yemen's "winter season" not yet ended, and such items as metal sand tracks for use if our vehicles bogged down in the deep sands of the lowland deserts.

What proved to be one of the most valuable assets in all our equipment was a portable radio receiver. I also bought a heavy bagful of the big silver coins still known as Maria Theresa dollars, the currency of all this area.†

---

* Saif al-Islam, title meaning "Sword of Islam," is used by all 13 sons of the Imam.

† See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Geography of Money," by William A. Du Puy, December, 1927, and "Pieces of Silver," by Frederick Simpich, September, 1933.


SAUDI ARABIA
Darb
Najran Oasis
Naqa
As Sabya
Suiaif
Wadi Dhamad
Qizan
Abu Arish
Jizain
Sa'da
Suq'Anan
Farasan Islands
Samta
Jirfain
Al Kharab
Maidi
Haradh
Khaiwan
Hajera
Miqar
Khamir
Mutaiyin
Wadi Ain
Luhaiya
Hajja
Amran
Wadi Harid
Mur
Haukaban
ArRaudha
Wadi Dhahr
Jabal Nukum
Kamaran
Marib
San'a
Zaidiya
Salif
Harib
YEMEN
Zubair Islands
Murzai'ya
Bajil
Ubal
Manakha
Dhaf
Beihan Sailan
Iyad
Hodeida
Wadi Siham
Dhuran
Ma'bar
Beihan al Qasab
Hammam
Wadi Markha
Bait al Faqih
Dhamar
Rada'
Wadi Duraiba
Wadi Beihan
Nisab
Ghulaifiqa
Wadi Zabid
Wadi Rima'
El Dherba
Menzil
Yarim
Beihan ad Daula
Yeshbum
Arjud
Zabid
Makhadar
Jabal Samara
Saum'a
Fazih
Al'Udain
Jabal Manar
Ibb
Al Beidha
Zuqar
Hais
Jabal Thamar
Lodar
Sayani
Hanish Kabir
Maushij
Wadi Hadaan
Ta'izz
Adh Dhala'
Mishal
Barasoli
Ruba
Mawiya
Wadi Ahwar
Ahwar
Yakhtul
Jabal Sabir
Rahida
Al Karsh
Mocha
Mauza
Al'Anad
Wadi Tiban
Shuqra
Khanfar
Beilul
Huneshiya
Assab
Halab
Lahej
ADEN PROTECTORATE
TIHAMA
Red Sea
ERITREA
Raheita
Bab el Mandeb
Perim
Ras al 'Ara
Sheikh'Othman
Aden
ETHIOPIA
Mussa Ali
Emedda
FRENCH SOMALILAND
Dougougoura
Gueherne
Gulf of Aden
STATUTE MILES
Author's Route
TURKEY
U. S. S. R.
Mediterranean
IRAQ
IRAN
EGYPT
Red Sea
SAUDI ARABIA
Map Area
ANGLO-EGYPTIAN SUDAN
Gulf of Aden
ETHIOPIA
Indian Ocean
Lake Victoria

Drawn by H. E. Eastwood and Theodora Price

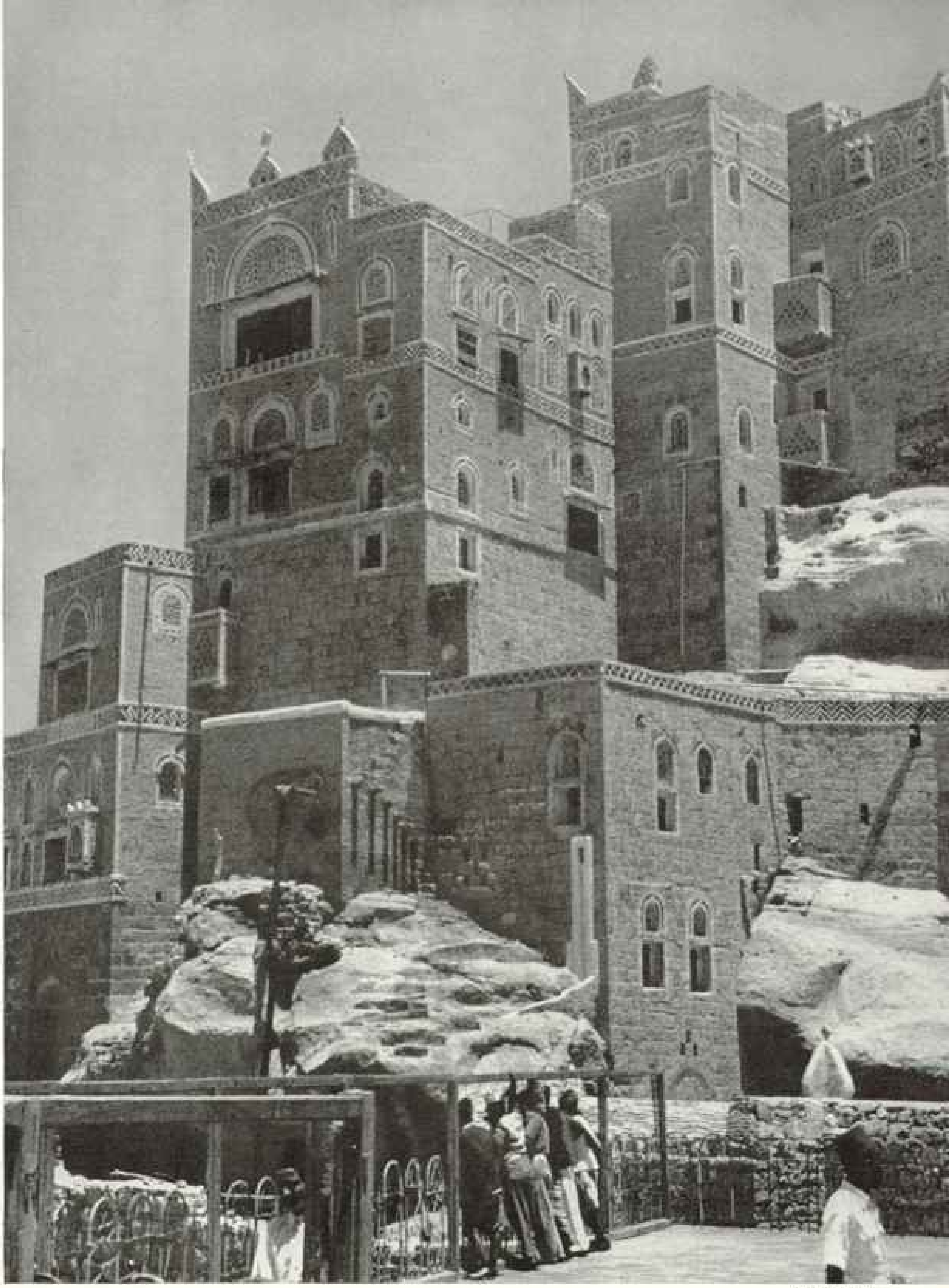
Yemen, New Member of the United Nations, Is Mountain Kingdom of Arabia's Peninsula

San'a, the capital, lies on a fertile plain 7,500 feet above Hodeida, the principal port, situated on the Tihama, or coastal plain. There are no modern surfaced roads. The author traveled by jeep, horse, and mule on his trip from Aden to visit the Imam at San'a. Yemen's eastern boundary is indefinite.

We set out early on the morning of March 20, 1945. The first stage was to be the 135-mile trip northwestward to Ta'izz. From there we hoped to be given permission to travel northward over the mountains by horse or muleback to San'a, via the caravan trails leading through the mountain towns of Ibb, Yarim, and Dhamar.

Failing that, we would proceed along the route our vehicles must traverse in any case, across the low mountains and desert from Ta'izz to Hodeida, on the Red Sea, then eastward through the high mountains to Ma'bar and San'a.

At old Aden we picked up my interpreter, Abdul; and Sheik Ali Gaheri, the Yemeni guide whom the Imam had sent to Aden to escort us throughout our journey. Sheik Ali,



Richard H. Sanger

Tier upon Tier, the Imam's Palace at Wadi Dhahr Rises from a Stone Base

Built on a high promontory, this was a favorite summer residence during the second Turkish domination of Yemen and is occasionally used by the present Imam. Rugged cliffs overlook a fertile valley (Plates XII-XIII).

in flowing white robes and turban, was waiting for us with the warm, gentle smile which —along with his inveterate chewing of kat* leaves, so dear to the Yemeni's palate and heart, and his hubble-bubble smoking—made him a beloved figure along the caravan trails of southern Arabia (Plate XVI).

"Well!" I said, looking at the heap of boxes and traveling bags stacked in front of Sheik Ali. "Do you suppose he wants us to take all of *those?*"

At this his brown eyes saddened and the smile was replaced by a countenance so forlorn that I didn't wait for an answer but started piling the things on the already overloaded carryall and trailer. I now suspect the boxes contained some of the special Occidental delicacies which were to make our fare so sumptuous throughout our journey.

We stopped for lunch at a little "inn" at Al Karsh, in the low mountains near the Yemen border. It was a low stone building with a thatched roof and had little stalls separated by stone walls and opening into an interconnecting passageway behind. This arrangement provided shelter for man and beast, the stalls being reserved for the man.

We heated a few tins of food over the innkeeper's small fire, drank some of the sweet, watery brew he made from the husks of "Mocha" coffee, and ate some pancakelike bread Abdul had brought along. The Arabs would not eat tinned goods containing meat, but I found them some fish and vegetables.

Welcomed to the Once Forbidden Land

Shortly after we had left Al Karsh we reached a barrier gate where bearded armed guardsmen with bandoleers slung from their shoulders bade us halt. This was the frontier post of Yemen.

We were relieved to find that all the guards wanted was to welcome us to Yemen and to tell us that emissaries of the Crown Prince, who had been waiting most of the day to greet us, had just given up the wait and returned to Rahida, our next stop.

Driving through valleys and mountains, by midafternoon we had reached Rahida, a small village of one- or several-storied buildings made of sun-dried mud blocks, located on a hilltop in the middle of a vast, bowllike valley. The rolling land was terraced in places, and peasants were plowing with oxen and wooden plows in preparation for planting millet when the rains should begin a few weeks hence.

We drove through a gateway and received a salute from the inevitable party of armed sentries with bandoleers. Into a fortresslike building we were ushered by an emissary of the Crown Prince. Our host urged us to remain for dinner and stay the night at Rahida, but Monty and I decided to push on to Ta'izz, even though it meant driving part of the distance at night.

After drinking several glasses of sweetened fruitade and cups of Turkish coffee, we went on, accompanied by the emissary.

The sun was sinking and there was a suggestion of chilliness in the air when we passed through shaded places. There was more vegetation here, including large willowlike trees. The mountain roads became rougher and steeper and the grades longer, taxing even the jeep.

Because of the drop in temperature that came with darkness, the big carryall stalled on the edge of a steep dropoff. It could be started again only after the carburetor had been readjusted to give a richer mixture of gasoline. We paused in the moonlight to put on warmer clothes.

Excited Baboons Object to Strangers

From the mountainside to our right suddenly there came the loud cacophony of a troop of baboons, apparently up in arms over the intrusion of strangers. Their excited barking and chattering in the moonlight was eerie, and Abdul urged us to drive on before the troop attacked us with stones.

Soon the driver was able to point out a building that was especially brightly lighted, saying that it was our "guesthouse" in Ta'izz. Before long our headlights showed a large building ahead and hundreds of Arabs in picturesque flowing robes lining our way as we drove up. The news of our visit had spread throughout Yemen.

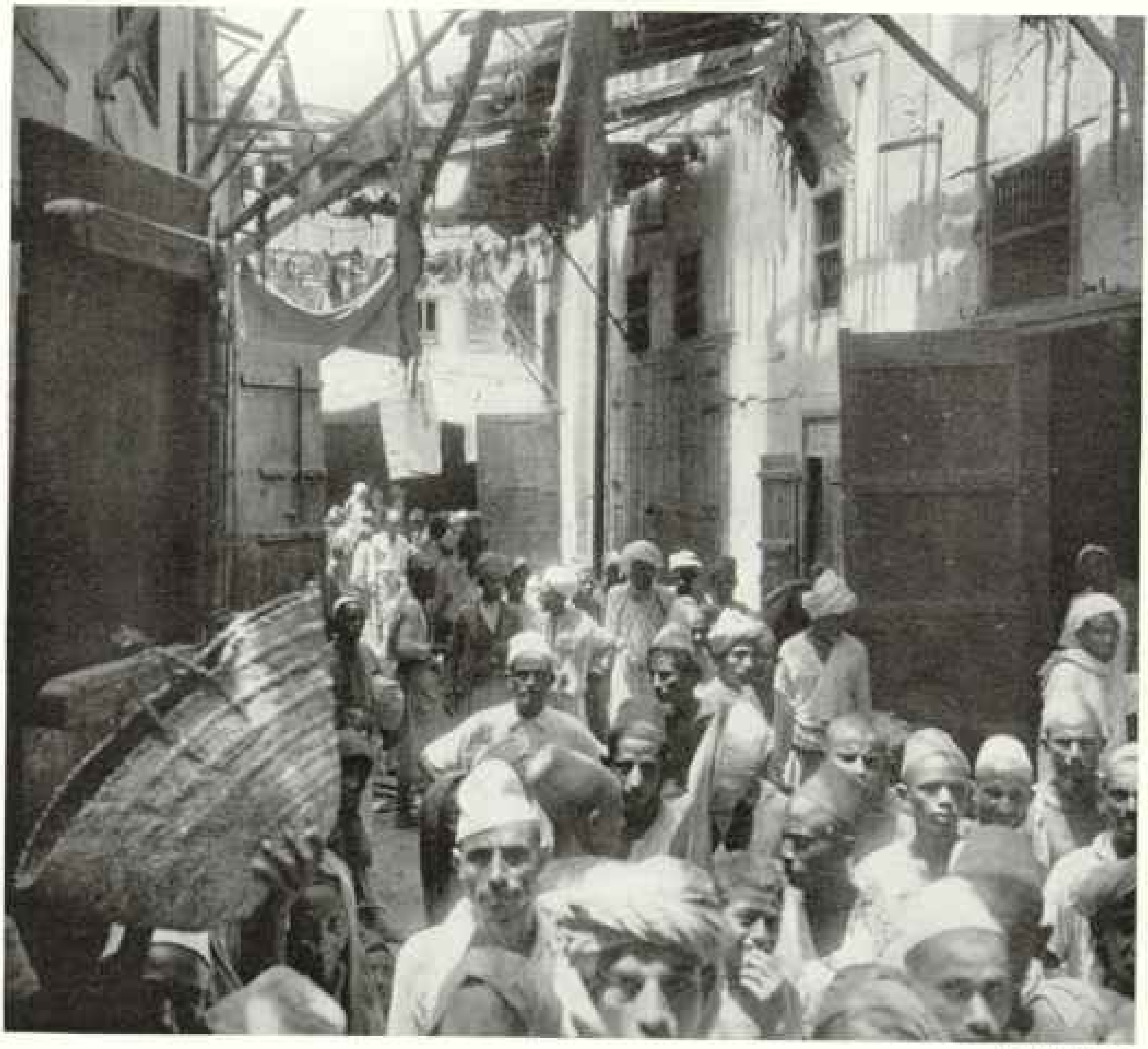
Sentries presented arms as we got out, and we were welcomed by a military officer in European-style uniform, who led us into the building and up the stairs to the second floor.

There we were greeted by a staff of Arab servants. The leading servant was in white uniform and wore a turban with a band bearing the emblem of Yemen, the sword of Ali, Mohammed's son-in-law, with three five-pointed stars above and two below, in white against a red background (Plate VII).

I was shown into a spacious room facing east, toward a huge building which I later learned was a palace of the Crown Prince. The room was furnished with an iron bed covered with an orange-and-black quilt, a half-length mirror, washstand, two chairs, and a small table. Persian rugs covered the floor

---

* See "'The Flower of Paradise,'" by Charles K. Moser, NATIONAL GEOGRAPHIC MAGAZINE, August, 1917.



Alfred M. Palmer

Under the Scant Shade of Worn Matting, Buyers Crowd the Hodeida Market

Doors at the sides open into individual shops. Most Yemen communities set one day a week for marketing. Farmers sell sheep and goats, grain, fruit, and vegetables. Their wives send rugs woven from wool. In exchange they buy pottery or enamelware, cotton or silk cloth, spices, and cosmetics.

and a kerosene pressure lantern hung from a wire in the center of the ceiling.

A curtain of sheeting was drawn across the lower half of the window, covering the large, rectangular panes of plain glass. The upper half was in the form of an arch fitted with a mosaic of colored glass.

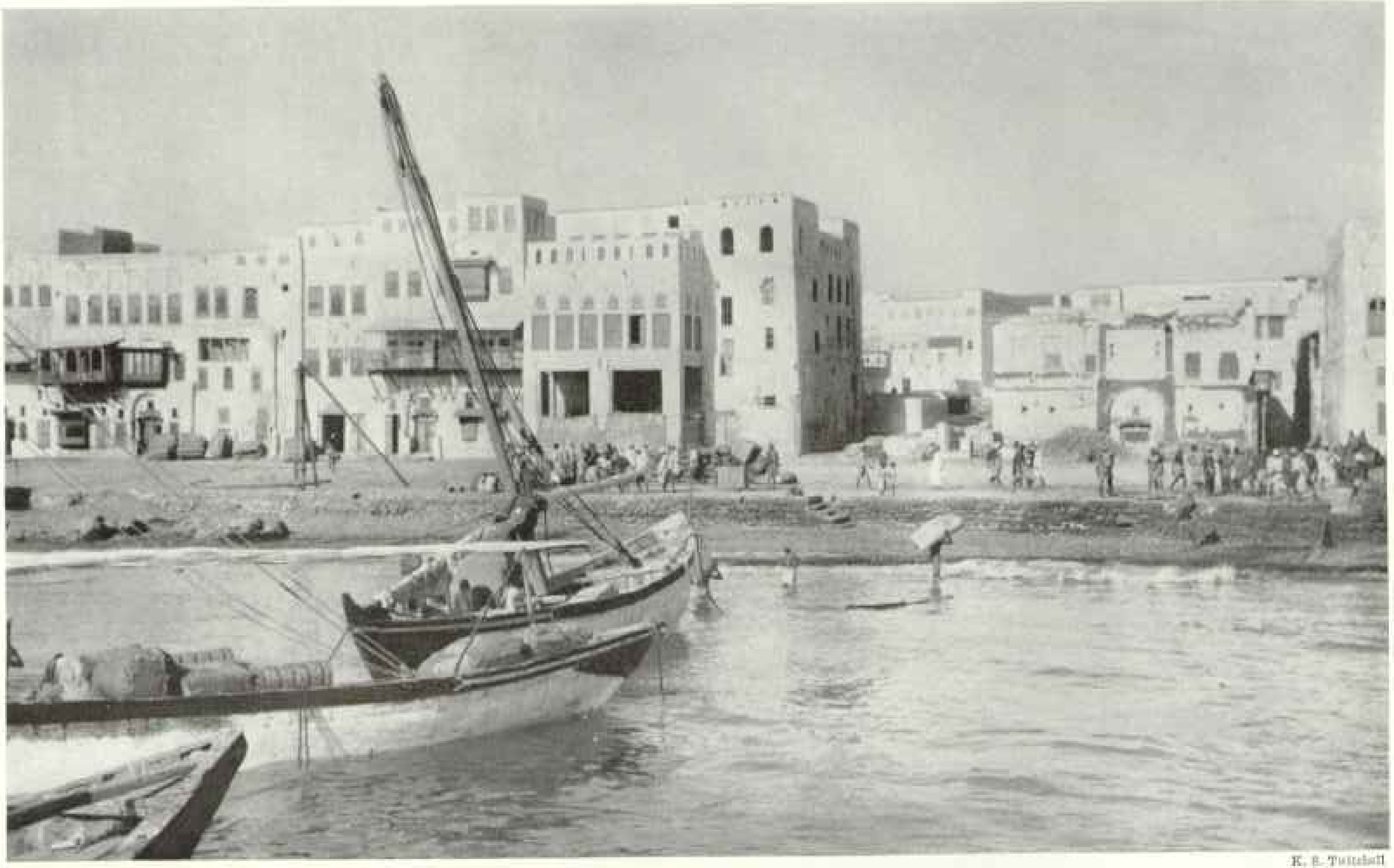
Hot Showers, Though Little Plumbing

Monty was shown to a similar room on the north, between two center rooms used for reception and dining, respectively, and Abdul was given a room on the west side, facing the old walled city of Ta'izz and only slightly less sumptuously furnished.

Our first request, for a bath, was speedily granted, and we were surprised to find a homemade shower with hot water. The toilet facilities were the "long-drop" system common throughout southern Arabia. Little urine troughs run from the second story down the outside of almost every house in Yemen, and I am told that the solid waste is cleaned out of the ground-floor room reserved for it once or twice a year.

After we had all had our showers, we entered the large dining room, and the meal that Ismail, the head servant, served us on a table covered with linen and good china, silver and glassware, showed us to what lengths the Yemenis had gone to ensure our comfort.

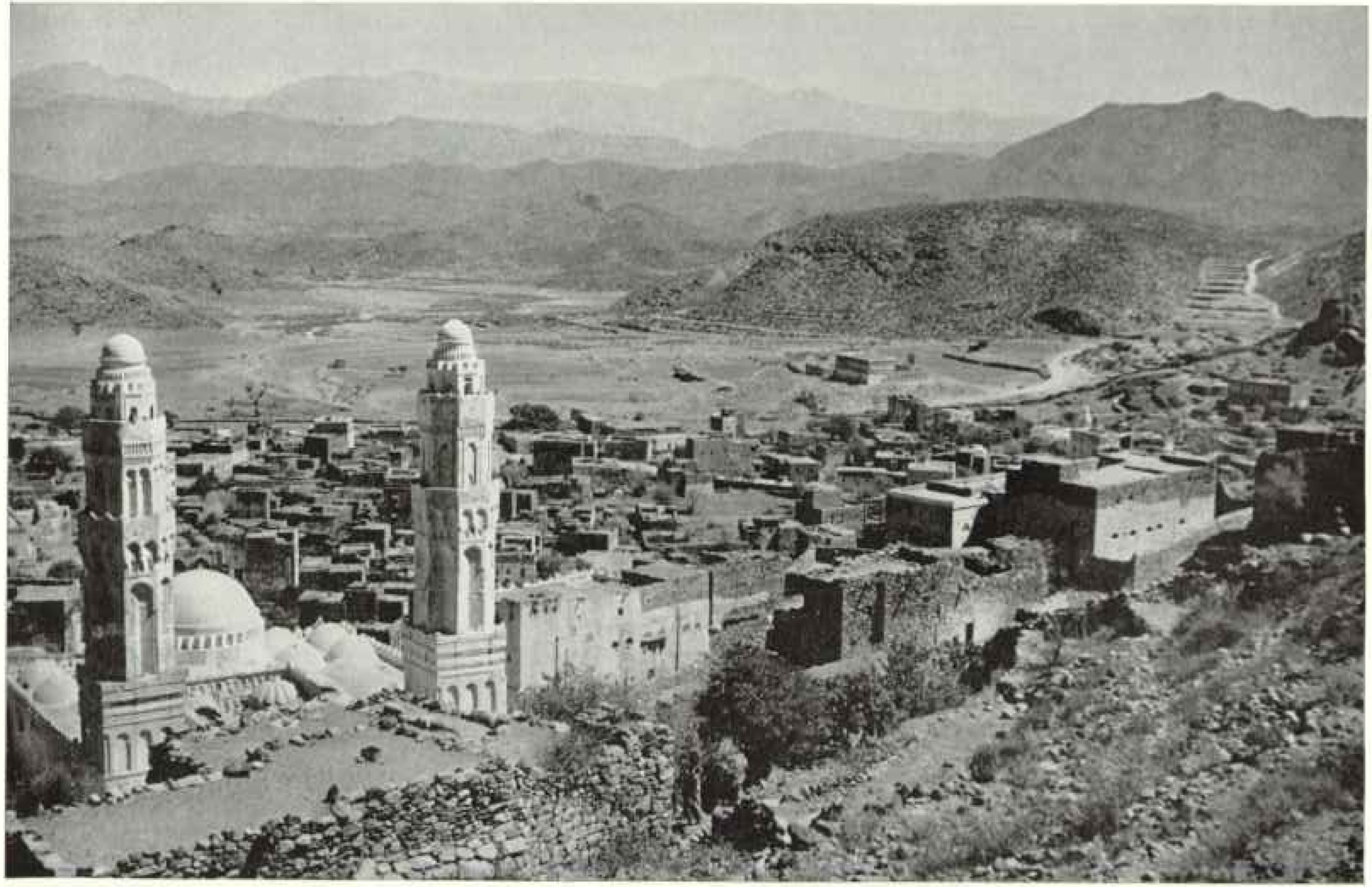
After a soup course we had canned fish with salad, then roast chicken with potatoes, peas, and asparagus, then custard and pears, followed by a demitasse of Mocha coffee and American cigarettes. Most of the food had



K. S. Twitchell

Sharp-prowed Dhows Transfer Cargo from Steamers Anchored Offshore at Hodeida, Chief Port of Yemen

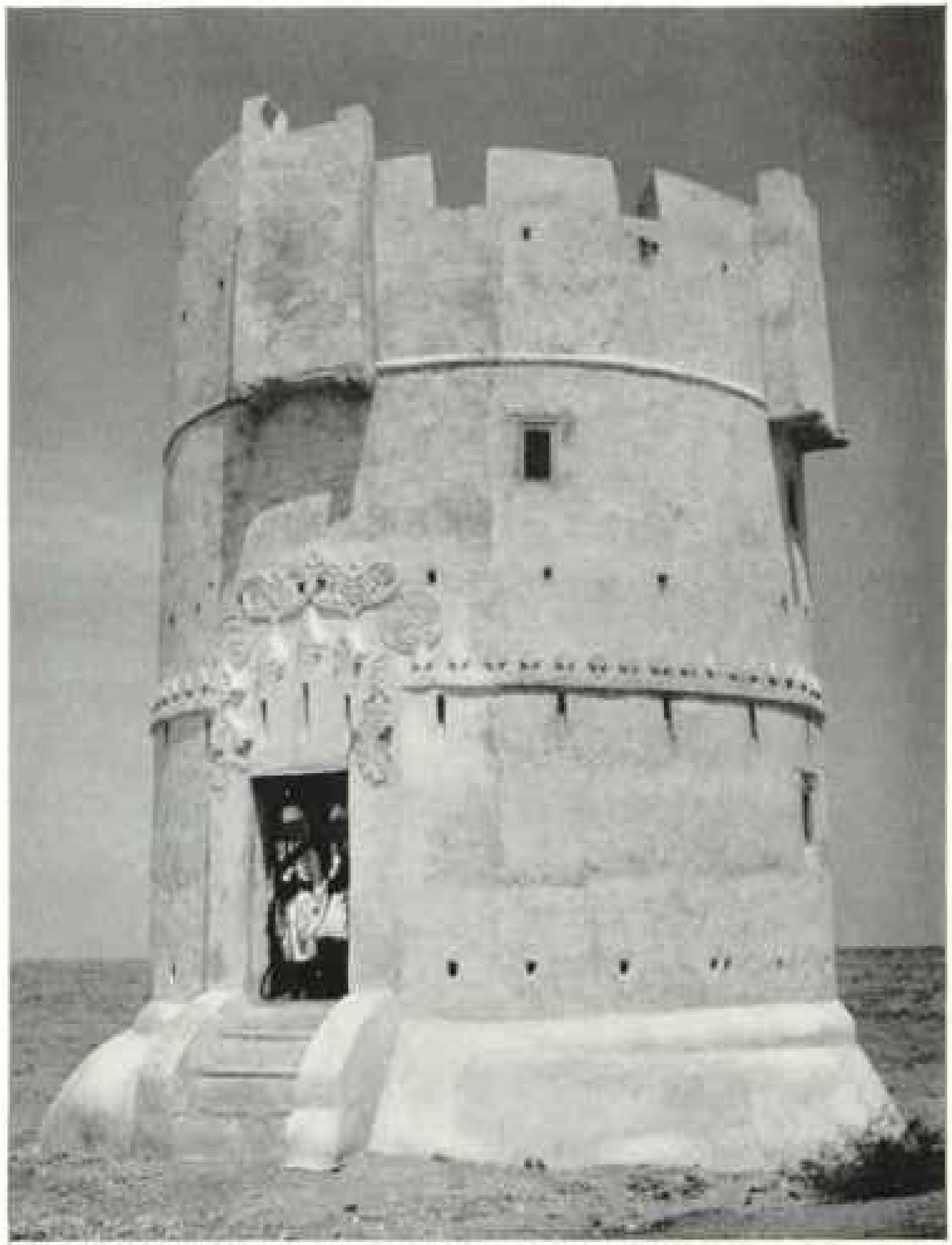
Such few large ships as call must stop in the Red Sea a mile or two offshore. Hodeida developed as a primitive coffee and date export center after Mocha fell into disuse. Ten miles north is a natural harbor which may be built into a modern port (page 656).



Alfred M. Palmer

As if Competing with the Surrounding Mountains, Minarets Thrust Rounded Domes High above Ta'izz Dwellings

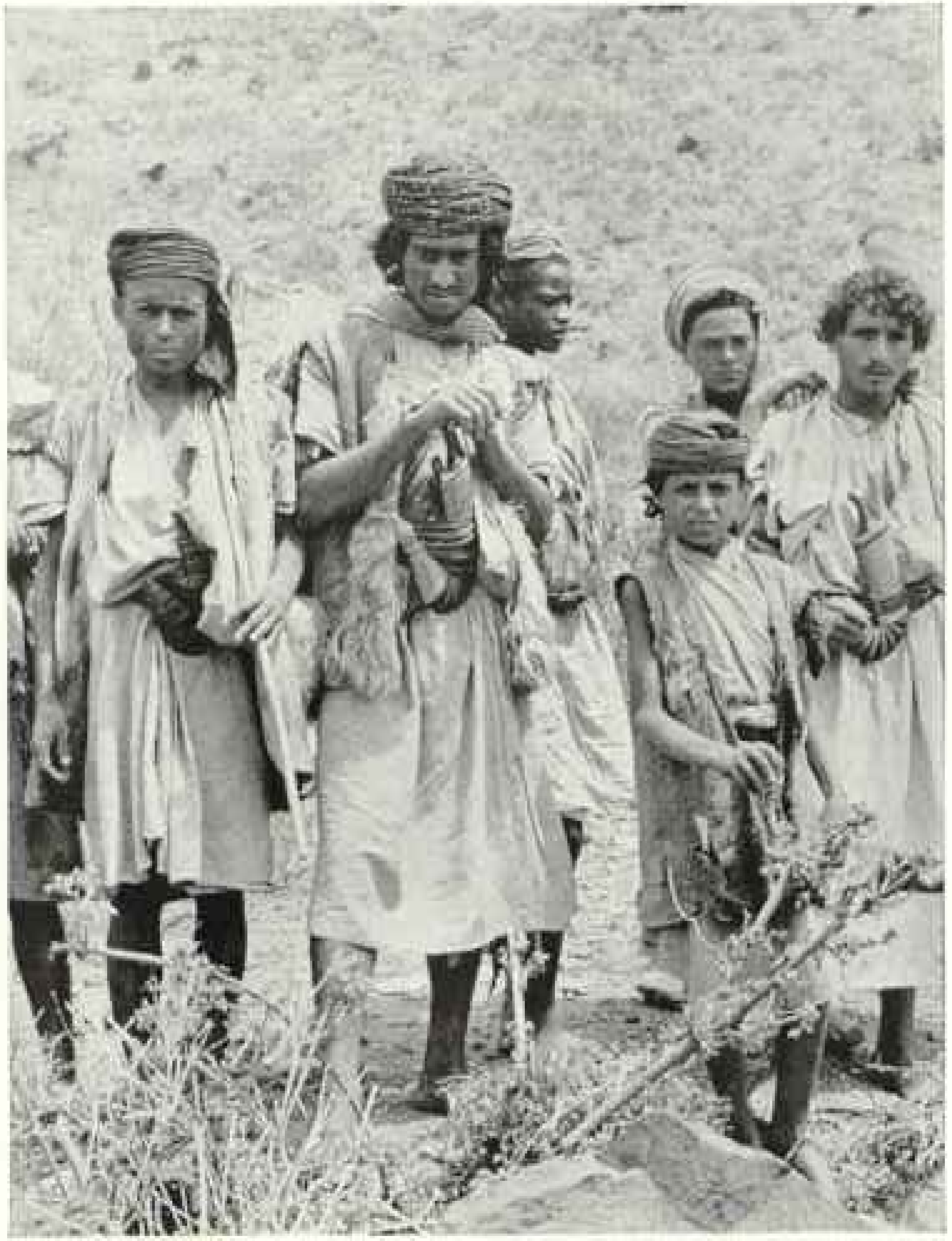
Ta'izz stands in a green valley at the base of Jabal Sabir, a peak nearly two miles high (page 643). Watchtowers dot the old city wall of sun-dried bricks. Here the southern coffee district centers. A 135-mile journey from Aden to Ta'izz marked the first stage of the American consul's tour of Yemen (page 634).



Alfred M. Palmer

Carvings Surmount the Door of an Ancient Watchtower

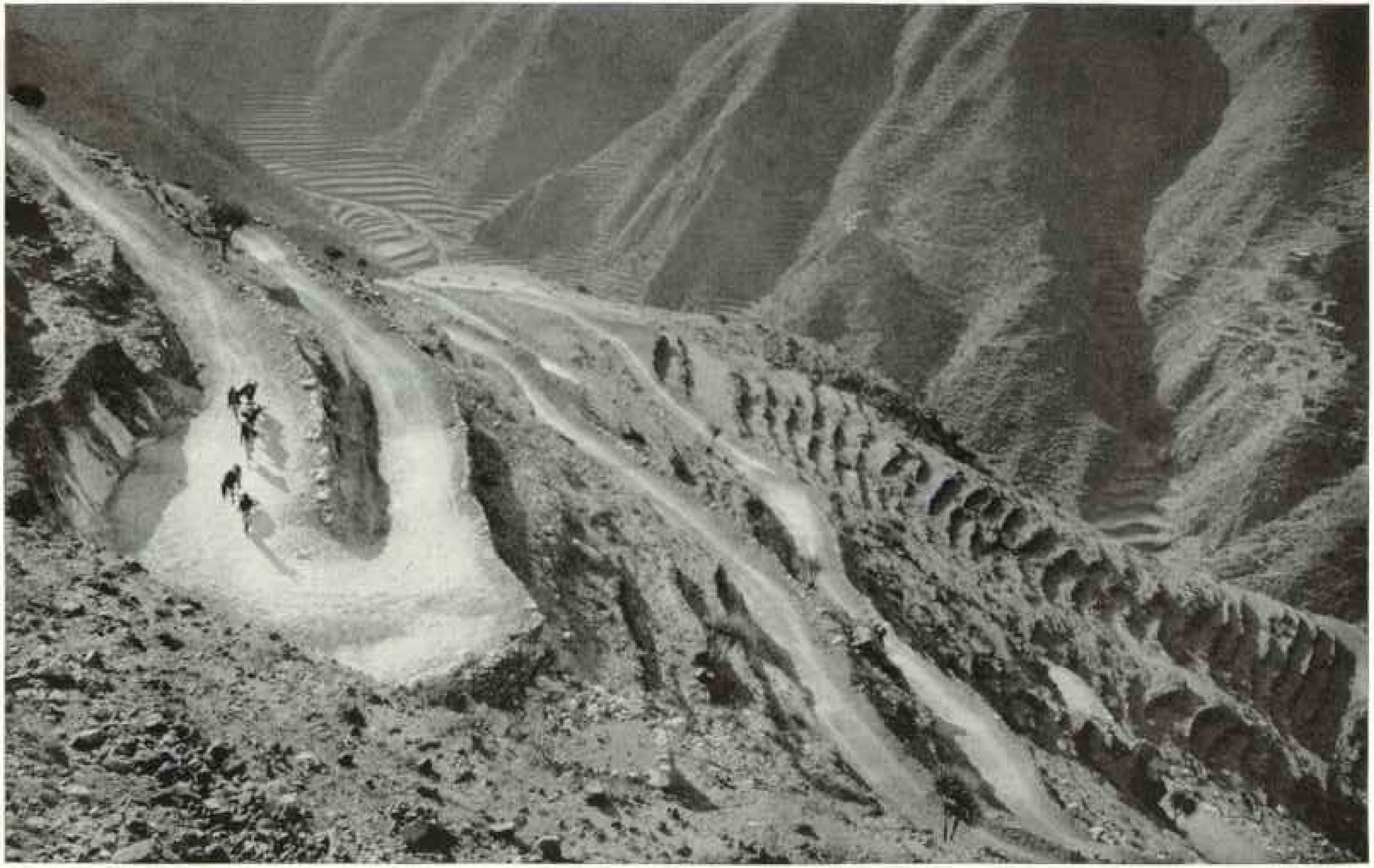
This structure outside Hodeida resembles a miniature castle (Plate XIII). Before the time of Christ, rulers of Yemen controlled much of the Arabian Peninsula and the country had a high civilization. Opening of the Red Sea for commerce shut off wealth from overland spice routes (pages 631, 655).



Richard H. Sanger

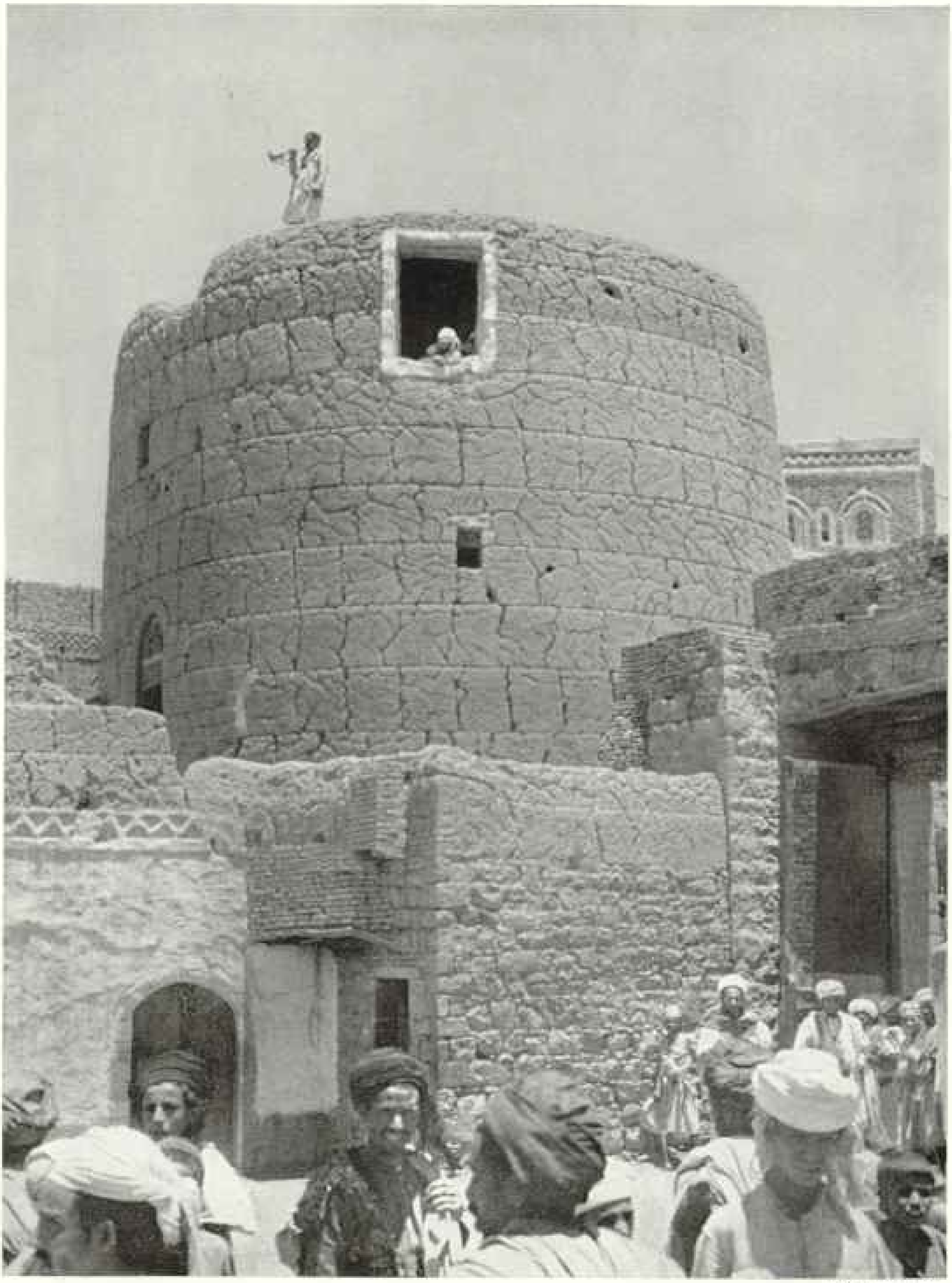
Ornate Daggers Mark Tribesmen as Well Dressed

Even small boys wear these knives if they can afford them. The broad curved blades fit into V-shaped sheaths. Horn handles bear silver decorations, and fancy scabbards indicate wealth or rank. Some highlanders carry longer bayonets crosswise in their belts.



K. S. Twitchell

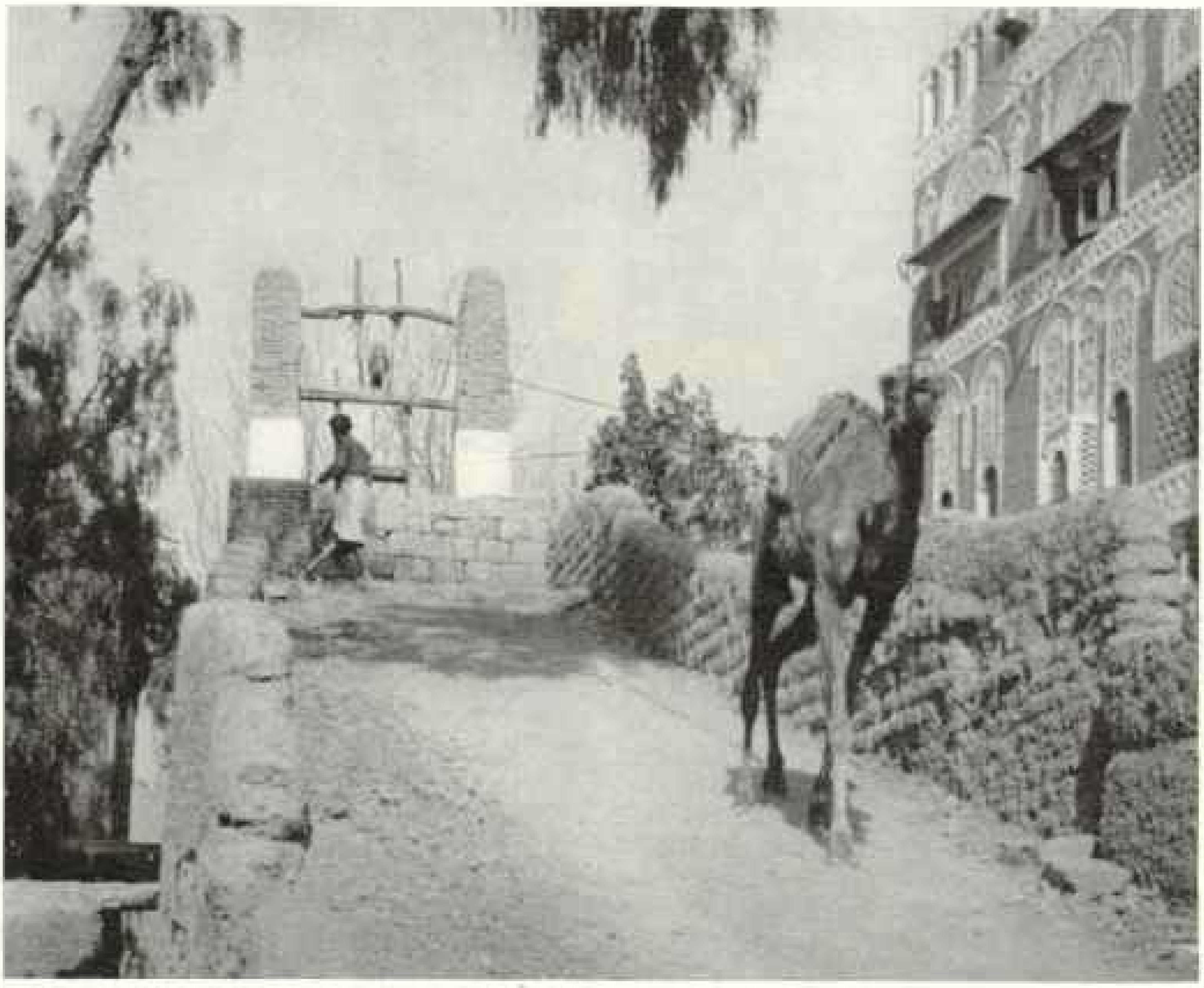
Slow Down for Curves! Yemenis Lead Pack Animals along a New Mountain Road Zigzagging Past Terraced Fields



Richard H. Sanger

From a Mud Tower Atop a San'a Gate, a Bugler Heralds the Weekly Parade to Prayer

At his call, the royal garrison escorts the Imam every Friday from his palace to the royal mosque (Plates VI and VII). About 2,000 troops take part in this display, including infantry, cavalry, artillery, cadets, and camel corps. In Ta'izz a similar array accompanies the Crown Prince (page 644).



Alfred M. Palmer

As in Biblical Days, a Camel Raises Water from a San'a Well

Walking down an incline, the animal draws water for drinking, cooking, or irrigation. In the latter case, the bucket is emptied into a clay channel and the water flows to the desired field. Irrigation in Yemen depends partially on retention of flood waters within mud or clay banks.

doubtless been imported especially for us. Ismail, a knowledgeable fellow who spoke French, said he had worked on French ships for several years.

Next morning I was awakened by the sound of bugles and strange band music. Looking out of the window, I saw a military band playing bass and snare drums, cymbals, two French horns, and eleven bugles. The music sounded weird to my ears.

Behind the band came about five companies of barefooted soldiers in Arab dress, in good marching order and carrying rifles. We wondered whether they had been sent to impress us, but were told later that this was a usual Wednesday-morning performance.

Ta'izz, Walled City of 15,000

After breakfast we learned that the Crown Prince was suffering from an illness and would not be able to see us that day. I expressed sympathy and said that if Monty could render any assistance I was sure he would be glad to offer it.

Accompanied by a guard of two soldiers, we went for a drive in the gardens below the guesthouse, where we saw a small field of alfalfa and another of tomatoes; pumpkins, bananas, cotton plants, and pomegranates were growing in a plot of shrubbery.

Then we drove through the gates of the large mud wall surrounding the town and, amid crowds which probably included most of the population of 15,000, saw the beautiful Mudhaffer Mosque and other notable edifices.

The market place of Ta'izz is crowded, like all *sukks*, but otherwise the city has an agreeable air of spaciousness. The oldest feature is the ancient wall, above the town, along which a conduit once passed. We saw the covered stone and cement troughs which direct the city's present water supply down from the mountains.

Ta'izz faces north, away from the foot of towering Jabal Sabir (9,863 feet) toward the high Yemen. Beyond to the horizon one sees, in ever-rising altitude, wave after wave of topsy-turvy mountains, brooding in the eternal haze (page 639).

From a distance Ta'izz appears studded with domes and minarets of the mosques of the city. Behind it, all the way up the precipitous mountainside, are castlelike strongholds on every promontory, dwelling places of the Zaidis.* It takes a full day to climb up to some of them.

We returned to the guesthouse for lunch, and afterward I received a *qadi* (*kadi*), one of the Imam's high-ranking officials, in my reception room.

He greeted us warmly and gave welcome news that the Crown Prince would receive us the following day. He also said we were free to take as many photographs as we pleased and to go almost anywhere we wished, an unusual privilege to be accorded foreigners.

However, when I tried to persuade the qadi that we should proceed direct to San'a over the mountains on horseback and send our vehicles on the roundabout way via Hodeida, he was gentle but firm in his insistence that we should ourselves take the motor road.

Finding that extensive arrangements had been made for us to proceed to San'a by way of Hodeida, we agreed to go to San'a with our cars and to come over the mountain trails through Yarim and Ibb on the way back.

Huge Prince Wears Jeweled Sword

On the following morning the qadi came to accompany us to the Prince's palace.

Crown Prince Ahmed is a huge man; one sensed dynamic power in his presence. He was dressed in a white silken robe and a cloak with large flowing sleeves. A broad, richly brocaded belt encircled his ample waist, and through it in front was stuck an ornamented silver scabbard from which a jeweled hilt protruded. His turban was white, delicately brocaded with blue and gold thread. His beard and mustache were sparse and gray.

He was wearing heavy dark glasses, which did not detract from his august presence.

Prince Ahmed bade us lift our glasses of orange-colored sweet drink and sipped his with loud and eloquent gusto. He welcomed us with the wish that our visit might strengthen relations between our countries.

Arab fashion, he depreciated everything we happened to mention about the comforts of Ta'izz, including the fine weather, and said, "Only wait until you get to San'a. There everything is perfect!"

At the end of our conversation he consented to have Monty prescribe a remedy for his illness, and we were gratified to learn later that it effected a complete cure within a very few days—a happy augury for our trip.

Friday, a Day of Worship and Pageantry

It was agreed that we should leave Ta'izz after prayers on the next day, Friday, the Mohammedan day of collective worship in the mosque.

To open this colorful spectacle, the Arab band I had seen the first morning marched down from the palace past our window, followed by more than 200 barefoot soldiers. A little later came a troop of racing camels in a gallant display of finery, including saddle blankets of vermilion. Two of the uniformed riders carried red Yemen banners atop long staves.

Next came a troop of well-mounted cavalry with large black standards bearing Arabic inscriptions in white; then the Crown Prince's motor vehicle (a station wagon!), followed by two more horsemen galloping superbly. It was like a scene out of *Arabian Nights*, plus a touch of Western industrial magic (page 632).

On their return the soldiers were singing in high-pitched falsetto as they marched by, and paused to indulge in a dagger dance beneath our window.

Midafternoon was sunny, but not too warm for comfort when we bade good-bye to the guesthouse staff and drove around the northern slopes of Jabal Sabir. From there the rugged mountain roads lead slowly down into a fertile valley where stately palms rise from terraced green fields of millet and other grains.

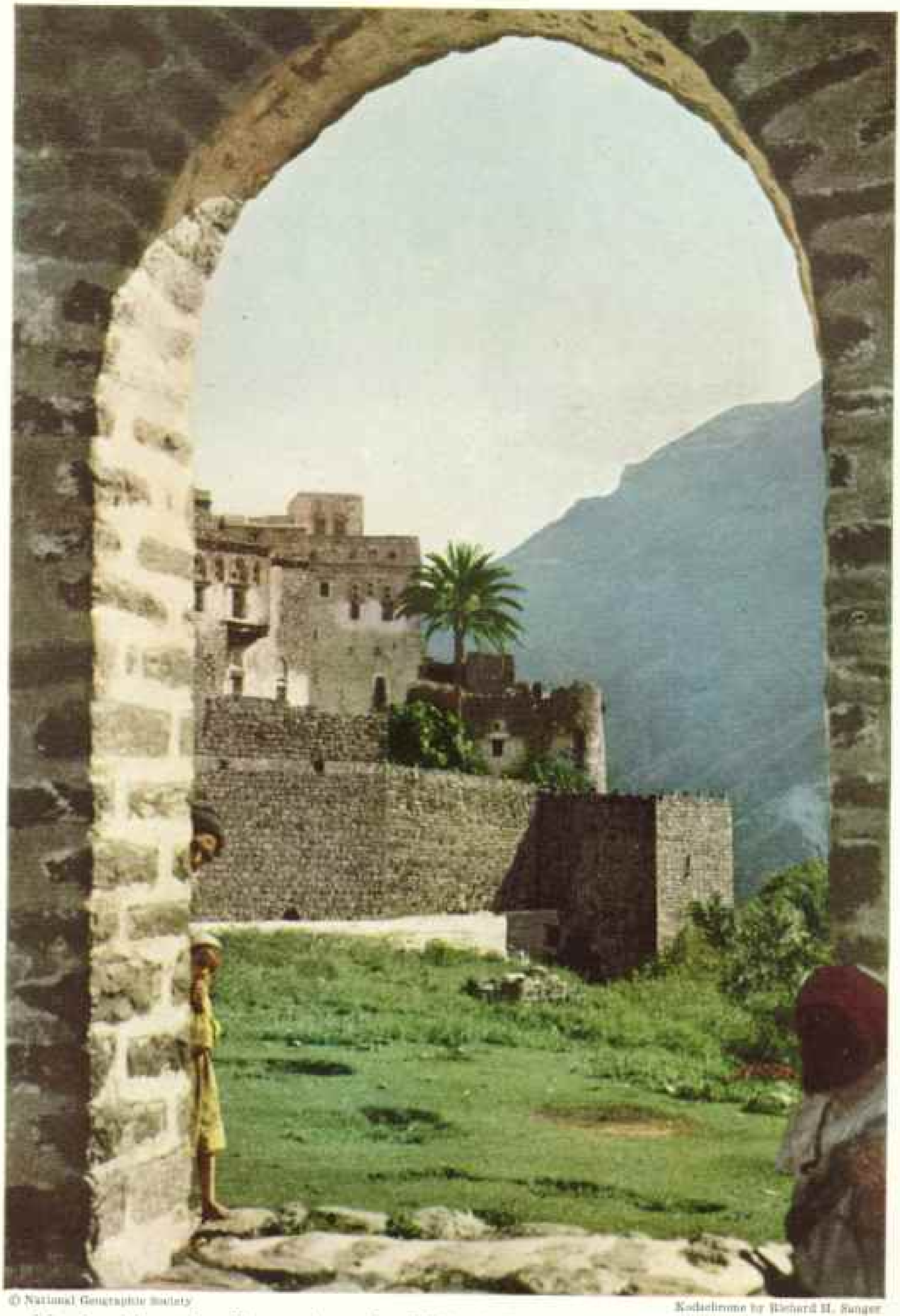
In places the roads were the worst we had seen thus far, but they improved when we passed through the fertile green valleys where the crops of the low Yemen grow. The terraces on either side of the wadis reflected the toil of countless generations.

Once Mohammed, the leading driver, stopped the jeep and pointed to the left, where a trail led off to the southwest. "That is the road to Mocha, only five hours away. Inshallah, one day you shall follow it, inshallah."

Abdul kept urging us to visit Mocha, and I began to suspect that he had ulterior motives. Abdul is a Sayid, and thus a descendant of the Prophet. Eventually he told us that his ancestors had once lived in the region of Mocha and that he owned property there which he had never seen.

---

* The Zaidis, a division of the Shiite sect of Islam, are the ruling class of Yemen and predominate in the highlands. The lowland inhabitants are Sunnites—orthodox Moslems.

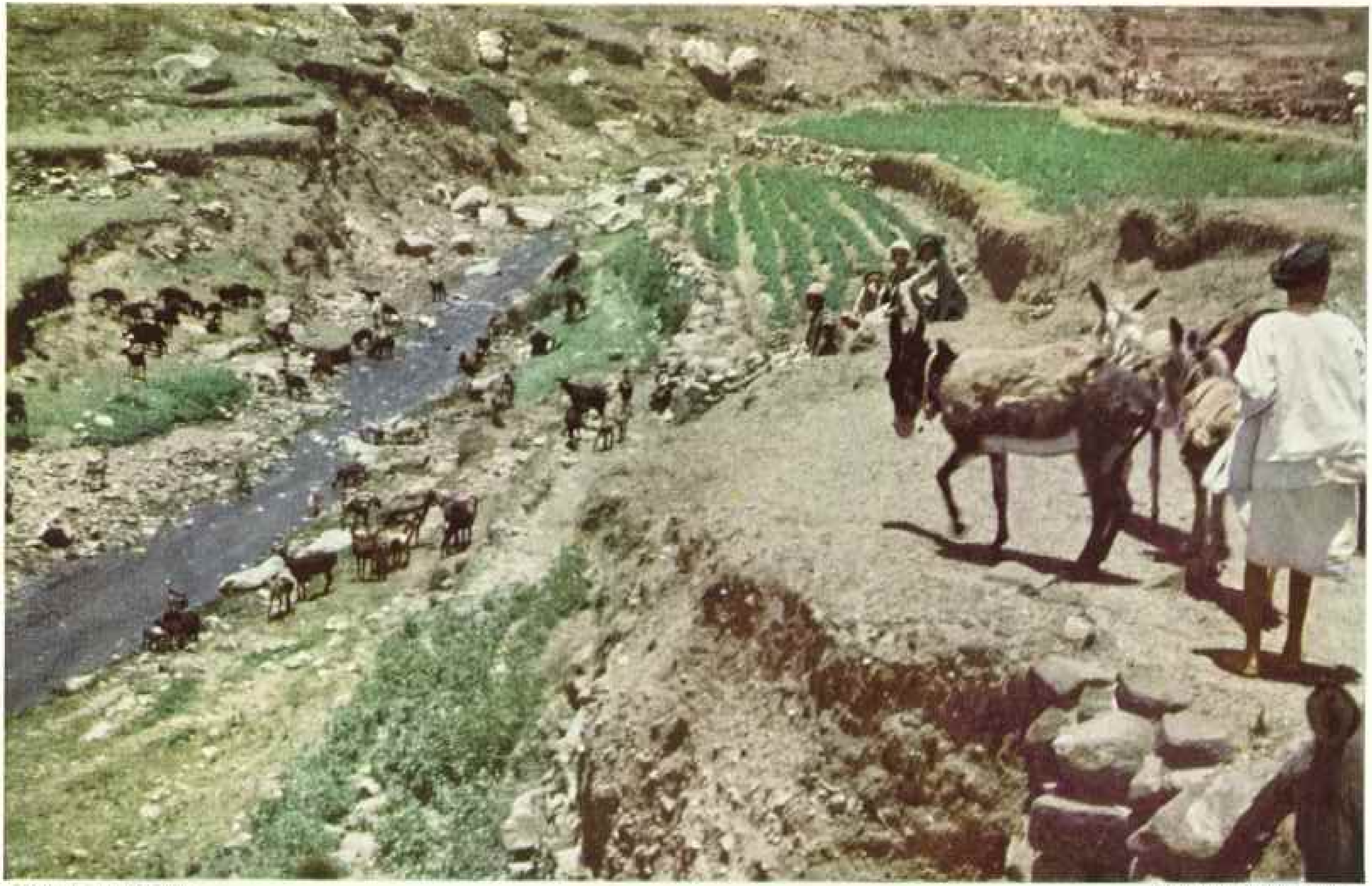


© National Geographic Society

Kodachrome by Richard H. Sanger

Massive Mountains Tower above the Walls of Ibb, High in the Mysterious Yemen

Virtually isolated by choice and geography, the Kingdom of Yemen in the southwestern corner of Arabia rises from the Red Sea to ridges about two miles high. Foreign visitors must have royal permission to enter.

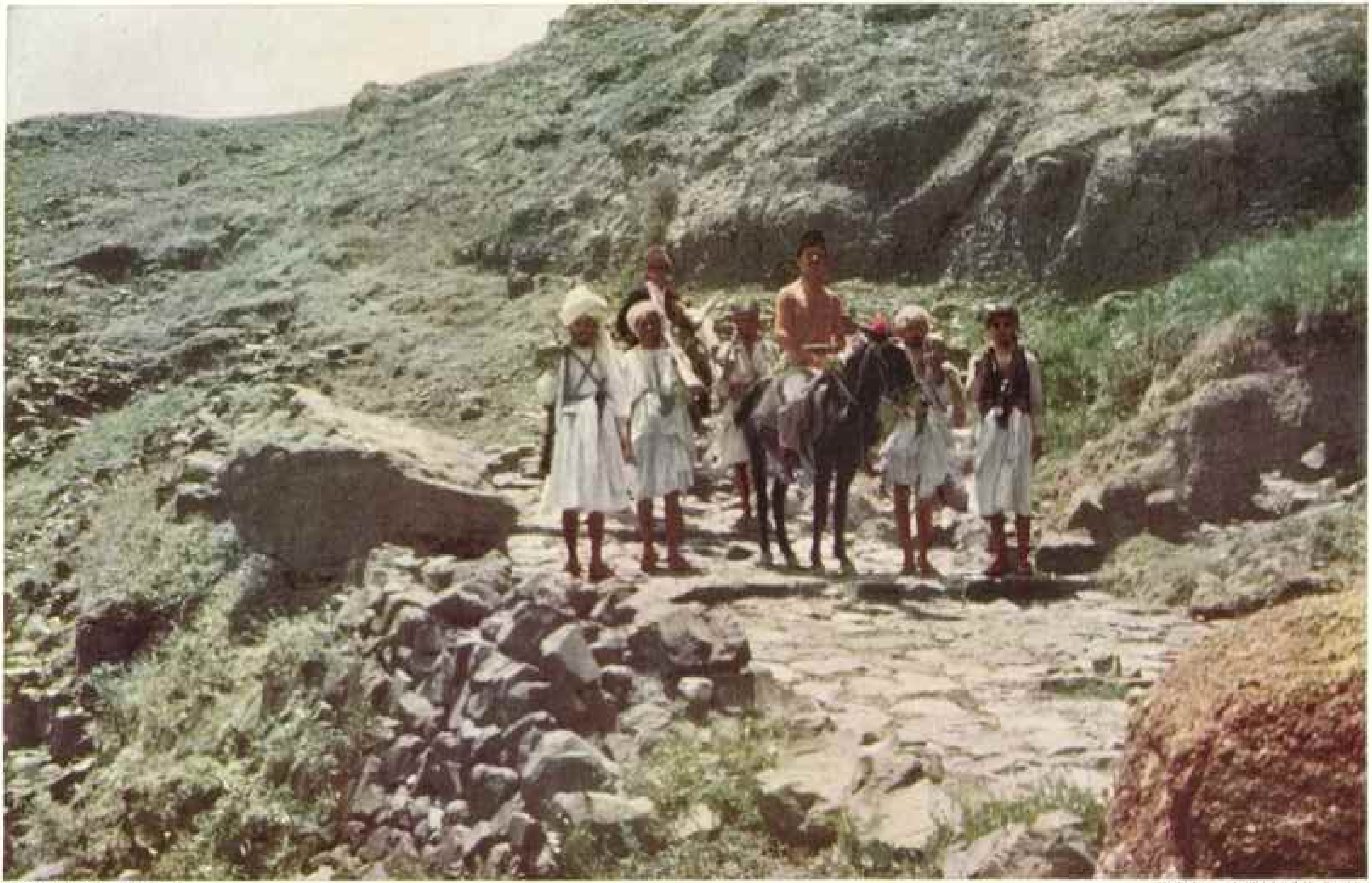


© National Geographic Society

Kodachrome by Richard H. Sanger

Water from a Rocky Ford Irrigates Hillside Potato Patches—and Attracts a Flock of Thirsty Goats

Yemeni highlanders raise sheep and goats to export their skins. Grain produced on fertile plateaus also is shipped abroad. Rich Mocha coffee flourishes on stone-faced terraces lining steep valleys. Sometimes branches placed overhead furnish artificial shade for the berries.

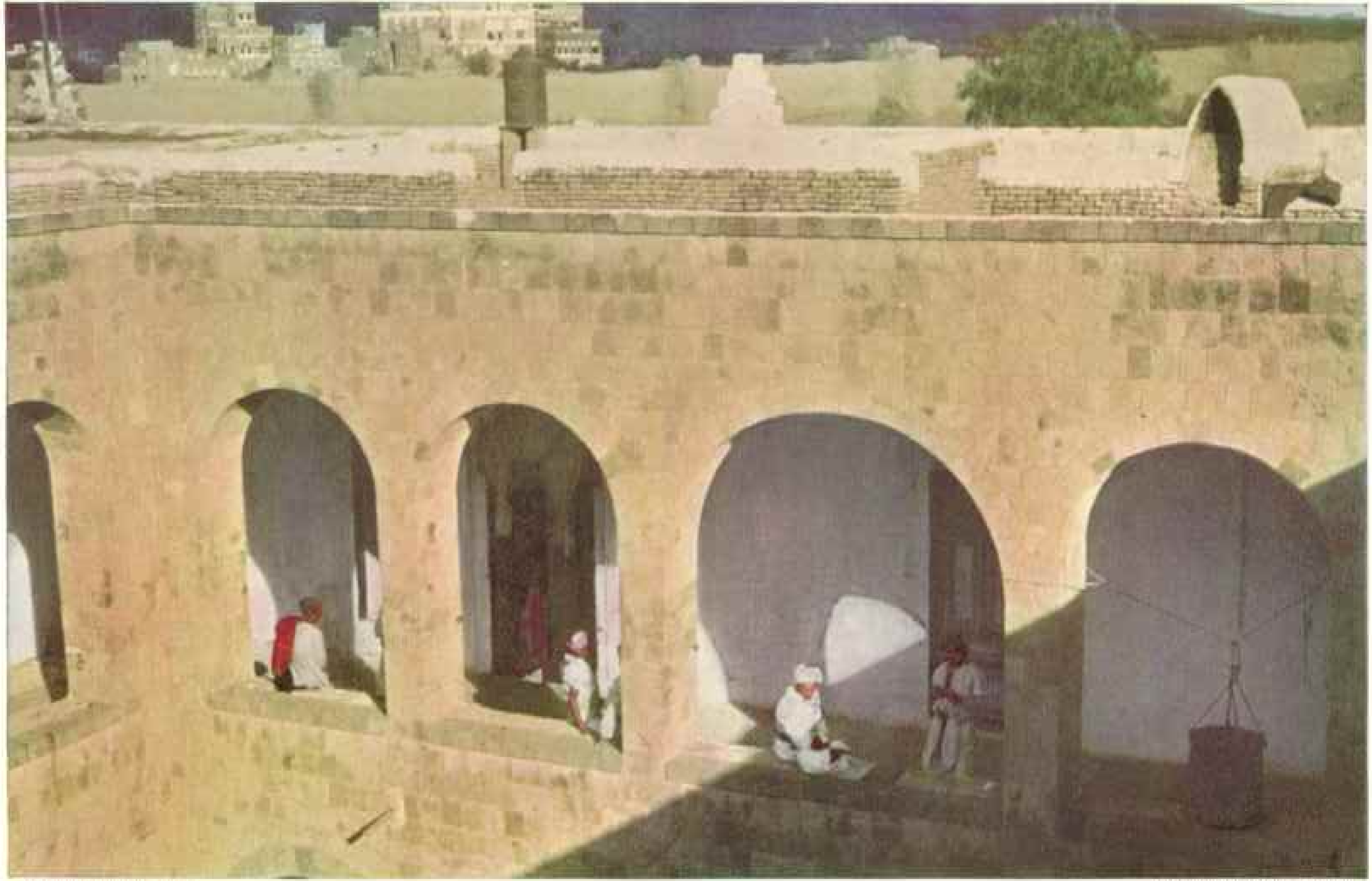


© National Geographic Society

Kodachrome by Richard H. Sanger

Yemeni Soldiers, Swathed in Tunics and Turbans, Escort an American Guest along a Cobblestone Highway

The author, stripped to the waist, has temporarily exchanged his jeep for a small mule. His young interpreter also is mounted, but his rifle-carrying bodyguards must walk. Such important Yemeni roads as this one are paved with large stones worn smooth through the centuries. Travelers must cover the steeper sections on foot.

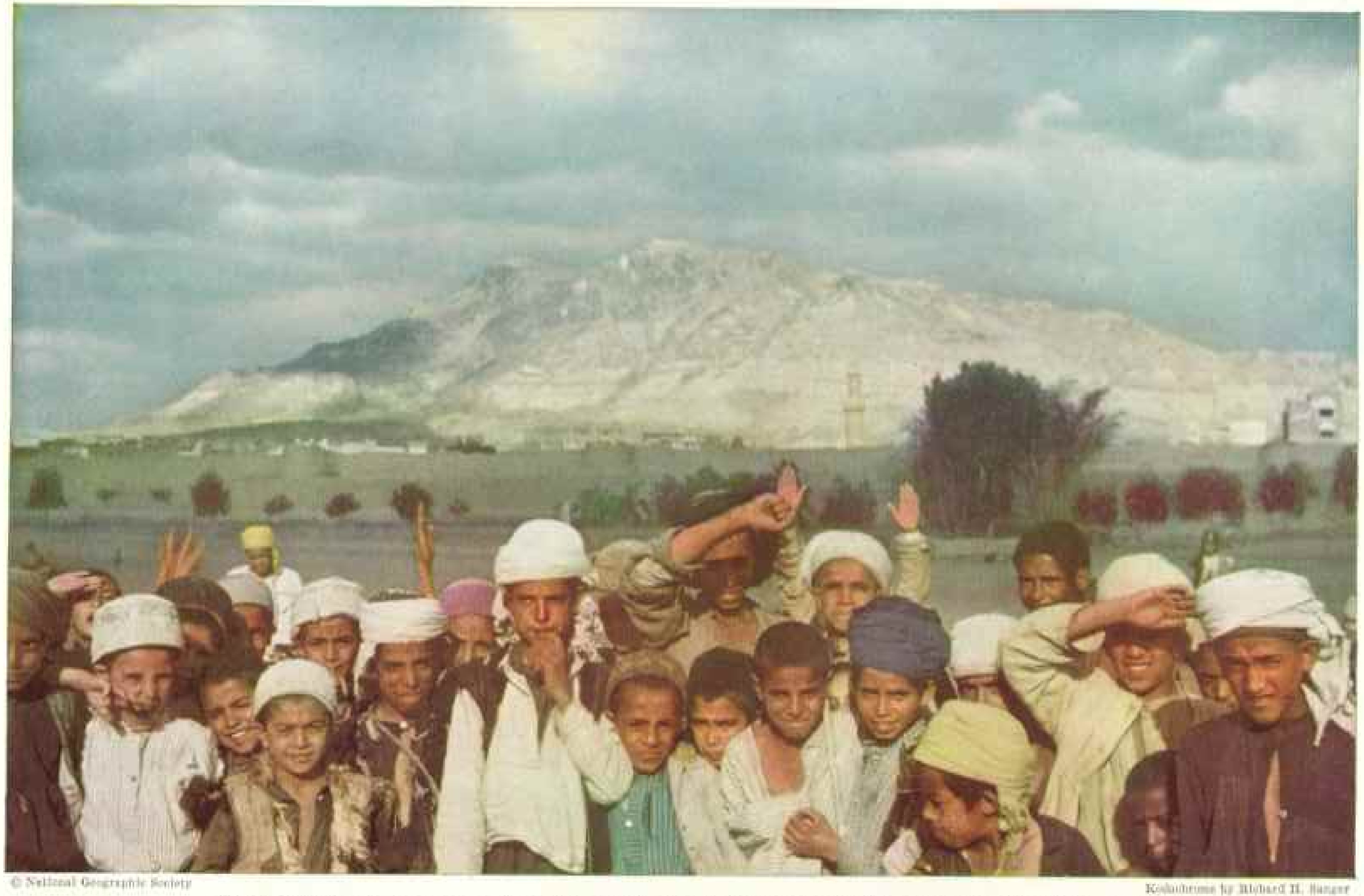


© National Geographic Society

Kodachrome by Richard H. Sanger

Around the Courtyard of the Royal Guesthouse at San'a, an Arched Portico Shades Second-story Rooms

The Imam, who traces his ancestry to Mohammed, provides Western furnishings for Western visitors. A Jewish merchant with his hair in curls waits in the archway at left. Two servants are talking in the next opening, while in the third a Yemeni merchant sits beside his bundle of wares. His servant stands near by.

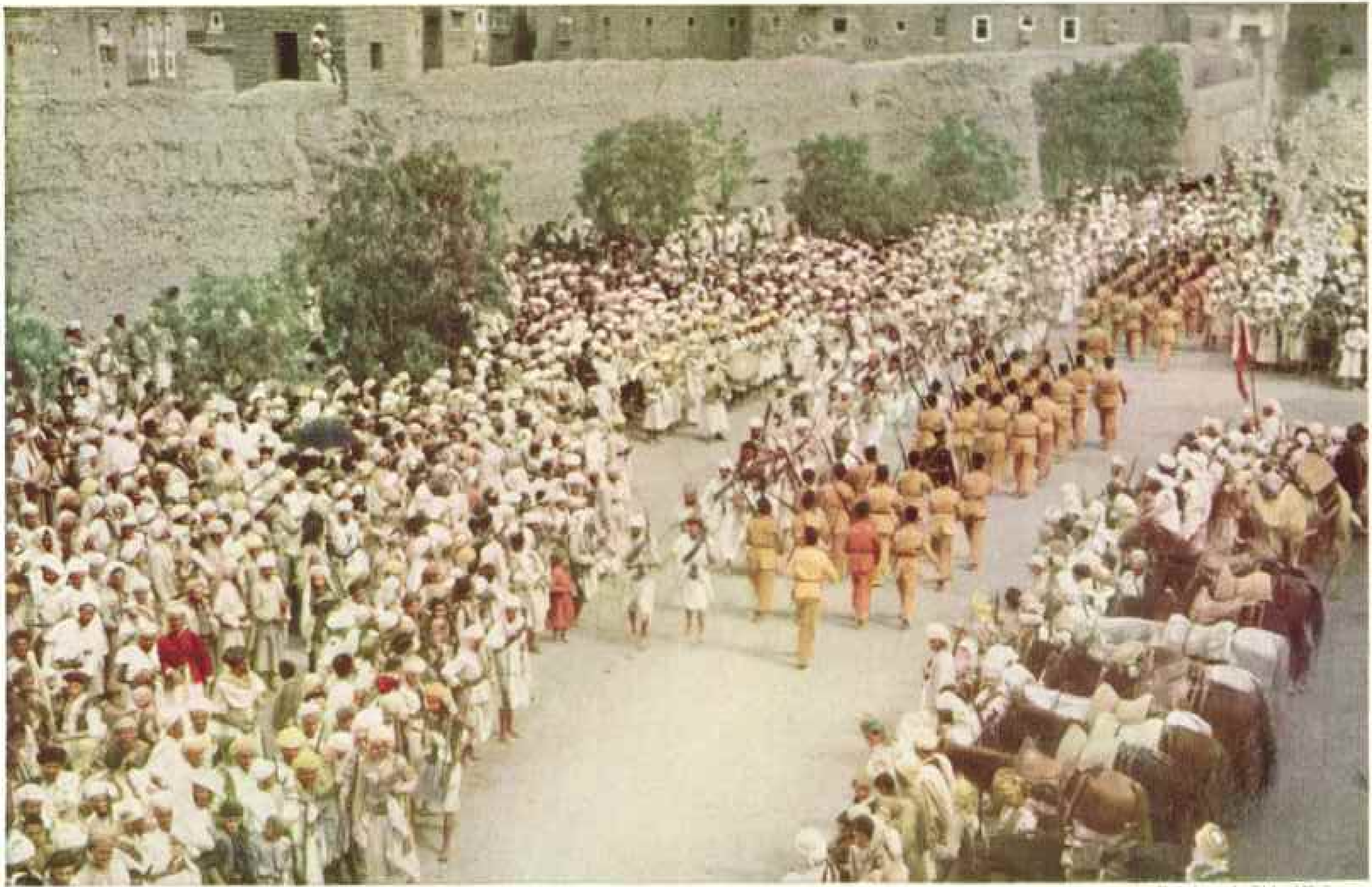


© National Geographic Society

Kodachrome by Richard H. Sanger

San'a Schoolboys, of Sturdy Mountain Stock, Stare Curiously at the American Consulate Jeep

Rising in the background is Jabal Nukum, a fortified eminence to which no foreigners are admitted. The Imam's treasure is reputed to be buried there. Most Yemeni people, estimated to total about four million, live in highland villages. Nomads are comparatively few.

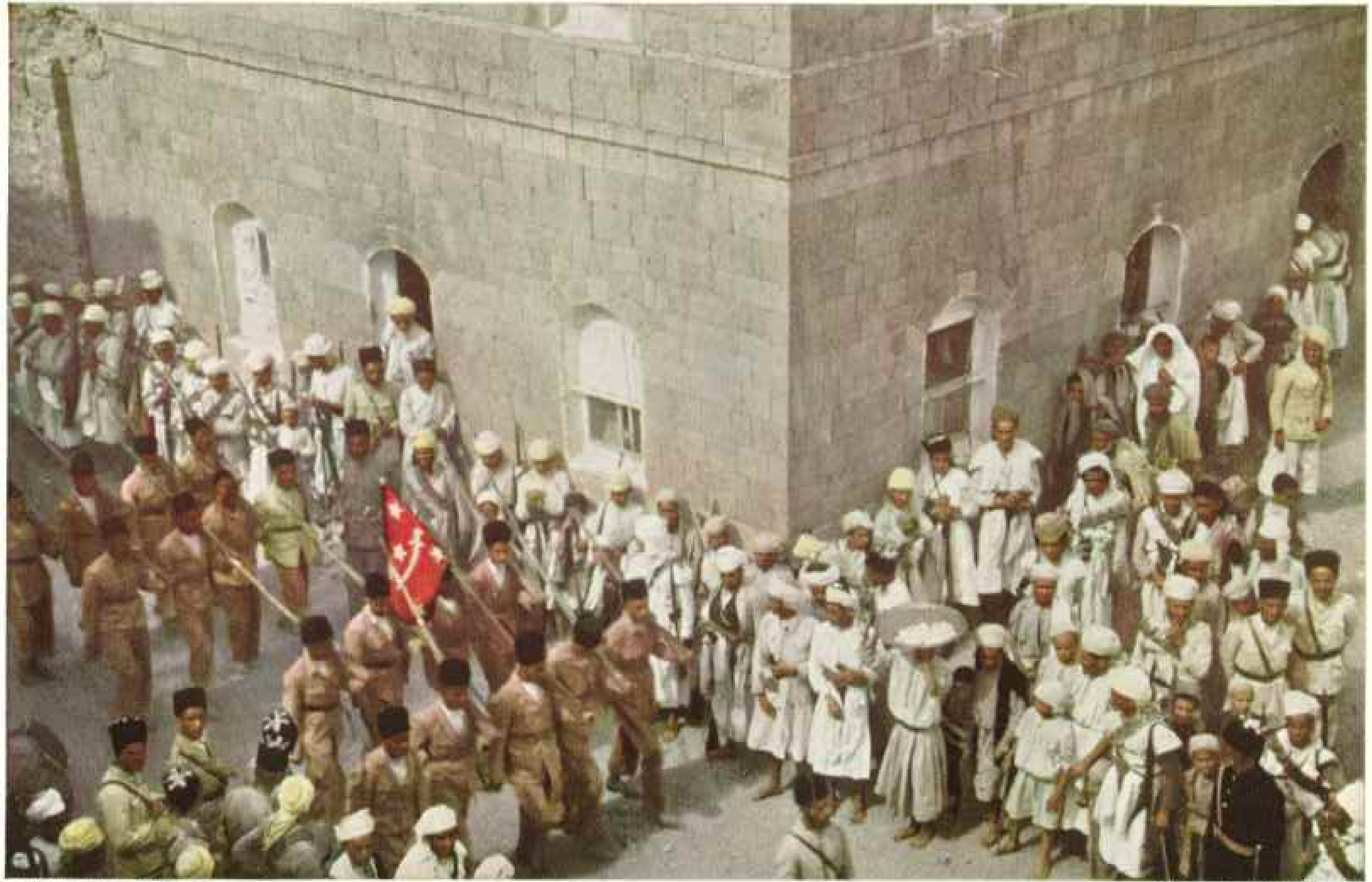


© National Geographic Society

Kodachrome by Richard H. Sanger

In Step to Band Music, Smartly Uniformed Royal Cadets File Past Native Riflemen During a Ceremonial Parade

Every Friday, troops march through San'a Palace Square to escort the Imam to prayer in the royal mosque. Spectators line the route for a glimpse of their ruler. Arabian horses in right foreground belong to wealthy merchants. San'a stands on a high plain. A stone and mud wall, out of repair, surrounds the old town.

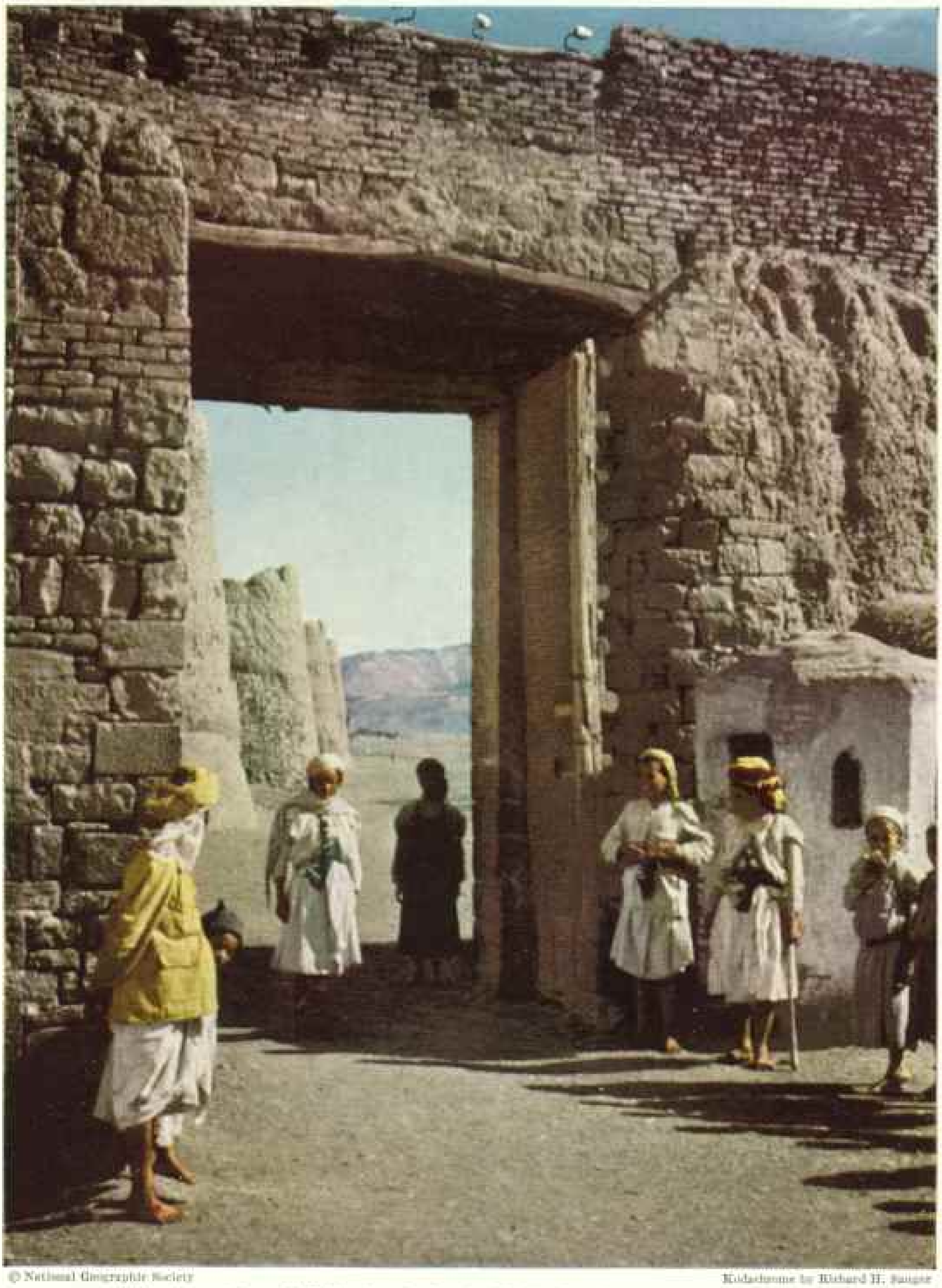


© National Geographic Society

Kodachrome by Richard H. Sanger

"West Pointers" of Yemen, Bearing Their Country's Red and White Flag, Draw Admiring Glances from a San'a Crowd

The Royal Cadet Corps forms a crack military unit. A scimitar and five white stars embellish the banner, displayed frequently in the capital. Different-colored turbans on riflemen of the side lines designate regiments or schools. Sweets fill the tray which a vender carries on his head.



© National Geographic Society

Kodachrome by Richard H. Sanger

This Gate, One of Eight in the San'a Wall, Leads to the Royal Palaces

All entrances to the city are closed at sundown and can be opened during the night only on the Imam's direct authority. Some buildings commemorate the vanished glory of ancient civilizations. In the Yemen lived the Queen of Sheba, whose visit to King Solomon is related in the Bible.

The present tenant had written to Abdul, saying the property was in poor condition, which seemed quite plausible. He promised to send rent money soon, but none ever arrived.

"Oh," I said, "you would like to have us throw a little scare into the old boy so that he will come across with the rent! All right, why not ask Sheik Ali——"

"No, no!" Abdul paused, then looked down his sunburned nose in embarrassment.

Object, Matrimony

"What *do* you want, then?" I inquired.

"Well, you see, I hear he has two daughters who are unmarried."

We had been listening to long laments from Abdul about how expensive it was to get a wife in Aden and how spoiled they were. Why, some of the girls didn't even bother to wear veils any more! We chided him for wanting to find a pretty girl for a wife and then keep her hidden from the rest of the world, but he replied that he didn't care how pretty she was, provided she was a good woman and he didn't have to pay her father too much.

When we asked how he could be sure he would like her, since he would not be able to see her before the marriage, he said his sister would find out for him.

"Sight unseen!" Monty exclaimed. "It beats me."

"Well, that settles it! We shall certainly try to visit Mocha on the return journey and find Abdul a wife," I said, after the laughter had died down.

Again we had to drive several hours after dark through some of the most picturesque lowland country to reach Hais, our next destination.

Torchlights and wailing bugles greeted us outside of Hais as we drove into the fortresslike enclosure where our guesthouse was located. We were ushered upstairs into a small room where the *amil*, or appointed "mayor," and other local officials bade us climb up on shelflike charpoys and join them in cross-legged repose among the multicolored cushions.

I had learned by this time to tuck my legs beneath me so as not to insult anyone by showing him the soles of my feet.

Tea was brought, and a little later we were invited to enter a dining room where stood a table, loaded down with Arab food but dimly seen in the lantern light. It was our first all-Arab meal on the trip, and I determined to eat Arab style, with my fingers. This was easy so far as the pieces of roast kid and chicken were concerned, but dipping up the sauces and gravy with pieces of pancakelike Arab bread required more skill.

After a hearty meal we were invited to make our beds on the charpoys, but we chose to set up our canvas cots on the roof, under the moonlit sky. I turned on my radio to get the news, and this created such a sensation that I left it on for a while so that dozens of Arabs squatting in the courtyard below could listen to some Western music.

Throughout the evening the amil, a slight man with sunken cheeks, had done his best to engage us in light conversation; but every move seemed an effort and it became obvious that he was ill.

On the following morning Dr. Palmer examined the amil with the aid of his stethoscope.

Monty's examination showed that he was suffering from advanced tuberculosis. He asked Abdul to interpret this and to say that the amil should go, if possible, to the little hospital we had heard was maintained by the Italian doctor in Ta'izz and should remain in bed six months for a complete rest.

These and other instructions Abdul translated. The amil gravely nodded and slowly drew his robes around his thin frame.

Tradition Defeats Modern Medicine

"What did the amil say about my diagnosis?" Monty asked later.

"Of course I didn't tell him *that*," replied Abdul calmly.

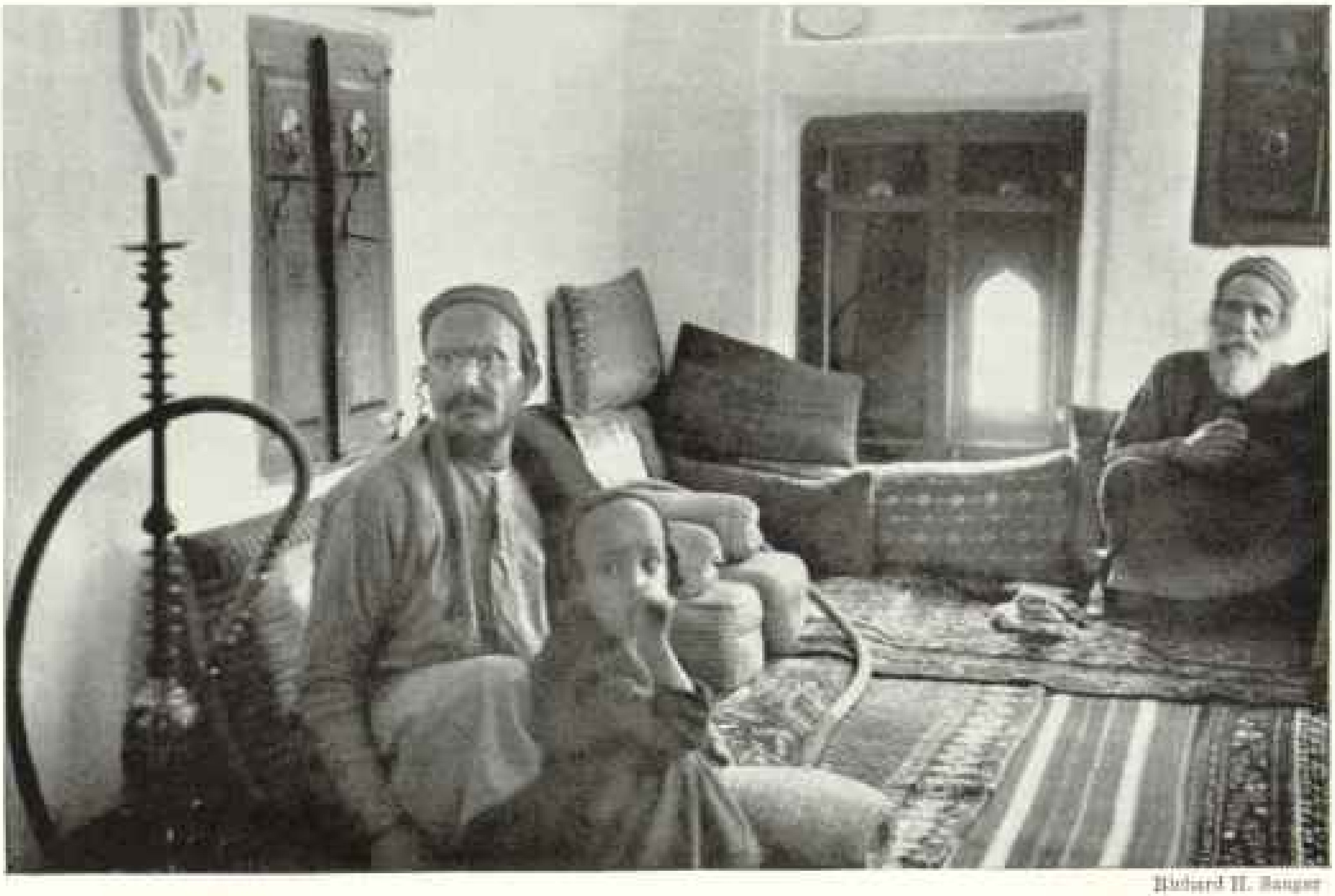
"You . . . what?" Monty was nearly speechless with surprise and anger.

Abdul remained unruffled. "In Arabia one never tells a man he has tuberculosis, or he will resign himself to death at once. Perhaps he will learn it from the others who heard you, but I hope he will not."

Such is the consequence of an almost complete lack of medical care in this country. Whether or not the poor amil ever learned Dr. Palmer's diagnosis, he died shortly after our return to Aden.

The officials had obviously been instructed to show our party every deference, and they did so with a will. We were escorted through the congested market place, a narrow passageway roofed over with rattan, and the small pottery works which for many centuries have given Hais a fame out of proportion to its importance. The glazed pottery was crude, but we bought some and took photographs.

It was a drive of only a little more than an hour and a half (29 miles) across relatively flat, poorly watered country to the ancient university town of Zabid. This city, of perhaps 20,000 souls, with towering mud walls, many mosques, and fortresslike citadel, delighted us at first sight. It is distinguished as the farthest point to which the Saudi-



Richard H. Sanger

Jewish Merchants of San'a Relax among Piles of Cushions Scattered on Rugs

Jewish communities have existed for centuries in Yemen towns. Many of the men are fine silversmiths; some tan leather or sell clothing. They wear skullcaps and ungirdled, knee-length tunics. A curl often hangs over each cheek. Yemen Jews strictly observe the Sabbath and fast days (page 660). They are not permitted to carry knives or other arms.

Arabian patrols probed in their drive against the Imam's forces in 1934.

Buglers trumpeted from the walls as we passed through the massive gates, and the population of the city turned out almost *en masse* to crowd around our jeep and carryall.

Ahead of us was a citadel, like a medieval castle, with towers and battlements. We had little time to gaze at it, since the amil and other local officials were waiting for us, a venerable group of men resplendent in white robes, beautifully wound turbans, and official cloaks.

They took us up to the amil's residence, which also housed a school. We sat among the charpoys drinking coffee and regretfully but firmly declined the amil's invitation to stay on for lunch, or for days if we could.

At last we ventured to ask permission to visit the ancient citadellike edifice across the way. Crossing to the huge gates and entering a narrow, winding passage, we found ourselves in a spacious courtyard with all manner of flowers and palms and fruit trees. I counted nine different kinds of fruit, including bananas, dates, grapes, papayas, lemons, coconuts, and figs. Seated with our hosts by a fountain in the center of the garden, we felt withdrawn entirely from the world of today.

We hated to leave, but our time was limited and we had to push on, not without gifts of figs and slender sticks of bamboo. When split open, the latter revealed a row of pink rosebuds, heavy with fragrance.

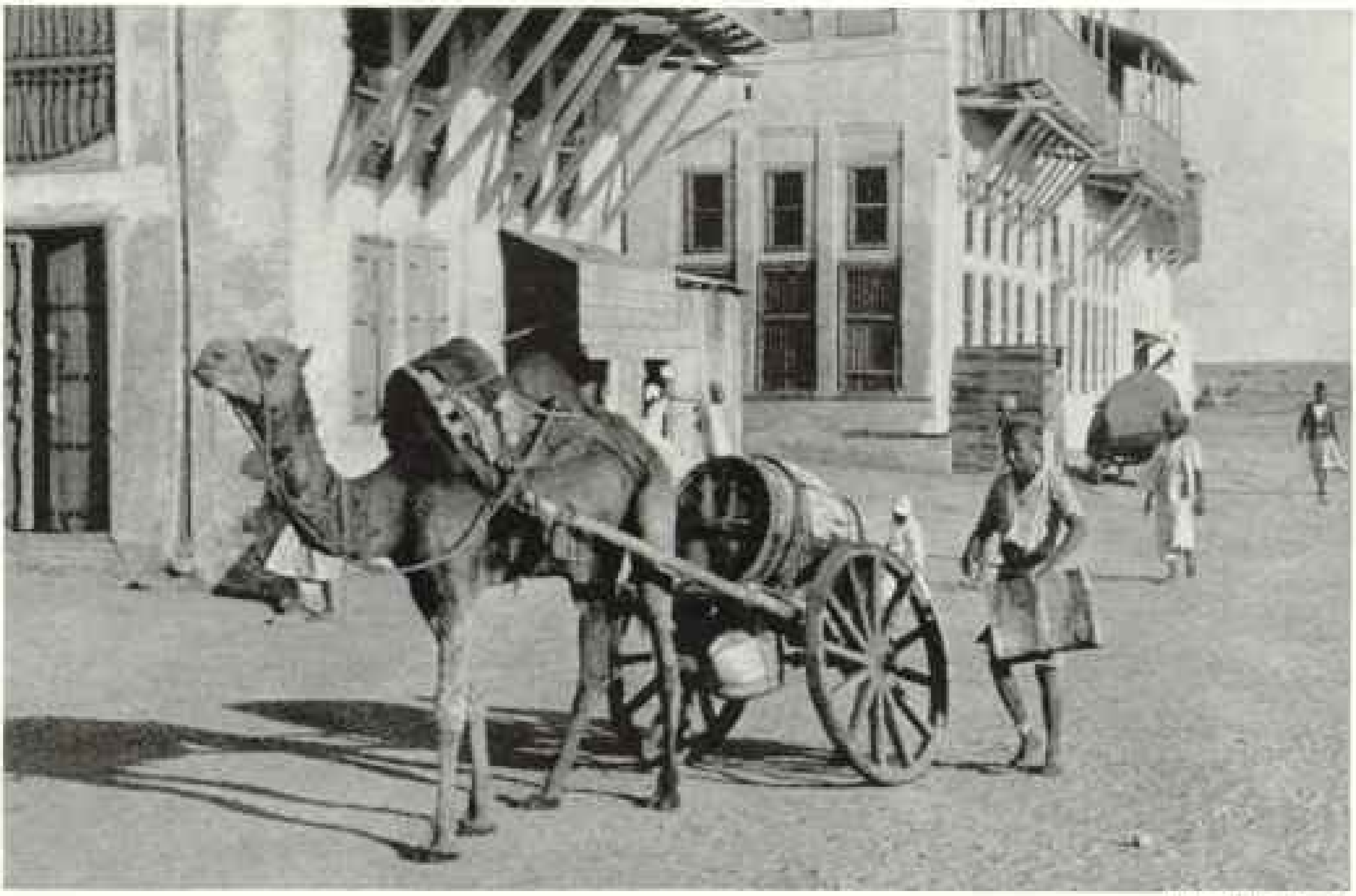
The drive to our luncheon stop, Bait al Faqih, lasted another two hours and led us through low sandy hills alternating with fertile terraced countryside. This town, with at least 15,000 people, had a well-built, modern look, although there were mosques appearing at least several centuries old.

We were especially impressed by a large citadel several hundred feet square on the outskirts of the town. It had been built by the Turks, but we could learn nothing of its history.

Arab-style Lunch Includes Watermelon

The amil served us lunch, Arab style, in his house along with a dozen or so of the local officials. After our hot, dusty drive, we especially relished large servings of the watermelons for which the place is noted.

After lunch Monty treated several persons



Richard H. Sanger

The Water Boy's Camel Drinks Little of His Precious Liquid

Along the Red Sea at Hodeida, door-to-door sale of water becomes a flourishing business, for the city has no water system. The empty gasoline cans held by the boy make convenient retail containers. The rickety cart is one of the few wheeled native vehicles in Yemen.

for various ailments, as he had done at other stops and would be called upon to do wherever we went in Yemen.

From Bait al Faqih to Hodeida there were fewer wadis and more desert. However, several times vegetation showed up in great green patches on the desert ahead like mirages, and the soil in these cultivated areas seemed to be rather good. The going was hard over the sand dunes, and the motors labored.

Usually there was no road, and I marveled at Mohammed's ability to find his way across the trackless, sandy wastes. Night was drawing on, and we had entered a cultivated area where the fields were separated by embankments higher than the carryall.

Suddenly we came upon a station wagon and were surprised to find that the amil of Hodeida himself had driven out 15 miles to meet us. We drove into the city past the usual throngs waiting to catch a glimpse of us.

Our guesthouse was a tall building on the seashore. In our quarters on the third floor the sea breeze afforded a welcome change from the blistering heat of the desert sands. The quarters were comfortably furnished, and the food served us at dinner was European style, prepared by a cook trained in Turkey.

The next morning we were received by the governor of Hodeida in a pleasant residency surrounded by trees, fountains, and gardens.

We talked for nearly an hour. I found our host to be an affable and intelligent man who knew much about the outside world.

"We Can Learn Much from America"

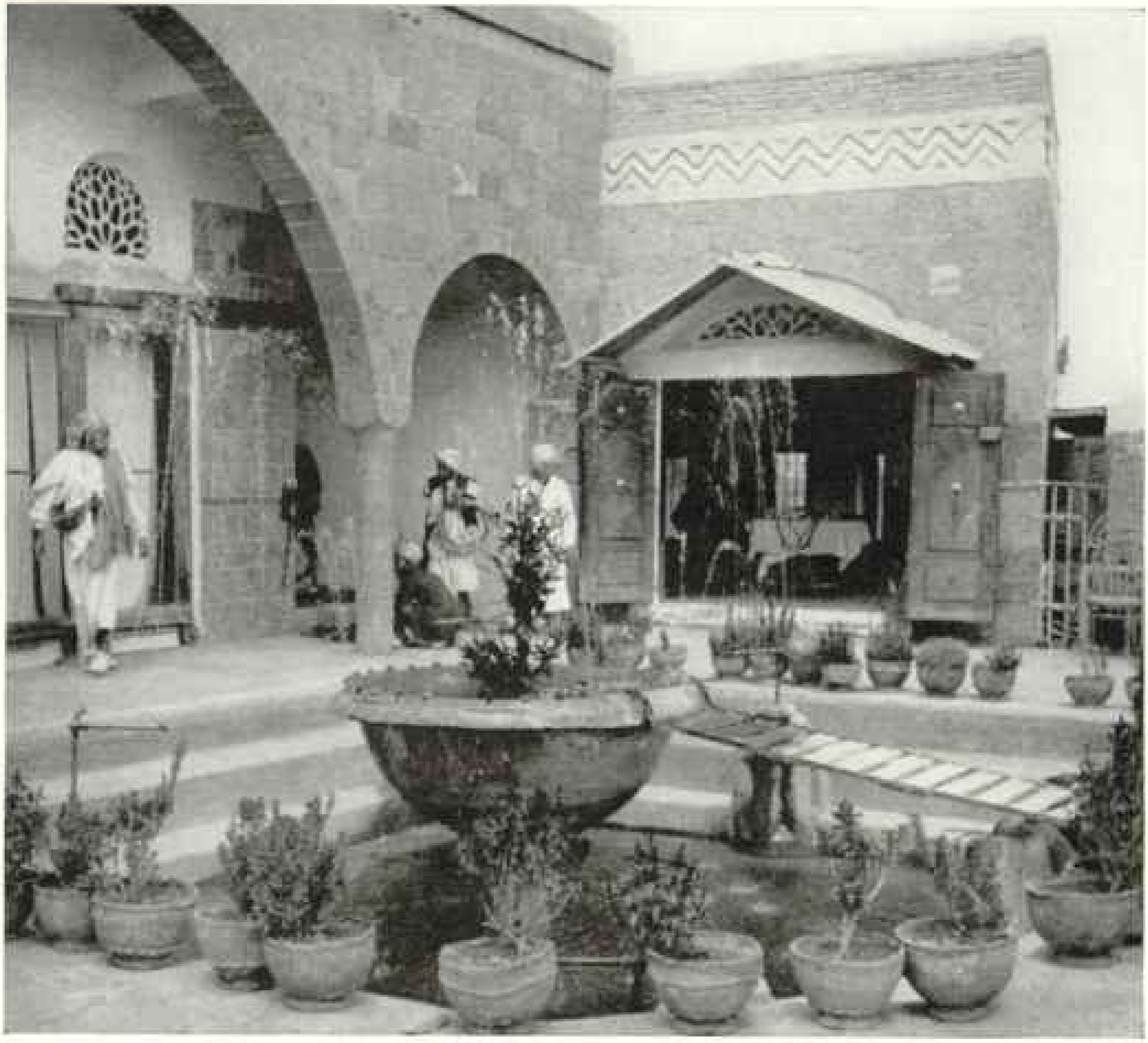
Our conversation was typical of many I had with Yemen officials.

"I know that we are fortunate to have this opportunity to visit your country," I said. "The Americans are many who would like to have such a privilege."

"Inshallah, they shall, inshallah!" The governor went on: "We hope that your visit will serve to strengthen the bonds of friendship between our two countries. We can learn much from America."

We discussed many things, from the coffee that is exported from Hodeida to the few kerosene-operated refrigerators being used in the city, and the history of old Yemen.

The governor was interested in developments in the United States, and I told him about many new conveniences which the age of electricity had made possible. Most Yemenis seemed proud of their own ancient



Alfred M. Palmer

Spray from a Fountain Cools the Imam's Summer Palace at Ar Raudha

The Imam Yahya, who succeeded his father on the throne in 1904, set out after World War I to win freedom for his country, which had been dominated by the Turks. Treaties in 1934 settled border disputes with Saudi Arabia and Great Britain's Aden Protectorate, and Yemen's independence was recognized (page 631).

culture, but few knew more than the vaguest details about the civilizations which had long flourished in their land, except legends which fitted into Mohammedan teachings with a moral.

The most popular of these was that the tremendous dam at Marib had burst because the people who lived in the valley below it grew wicked and Allah sent a rat to gnaw a hole in it and thus to wipe out the wicked people in a flood (page 631).

After our interview with the governor we drove around the city to view the crowded market places, the silolike watchtowers on the outskirts, and the godowns where enormous stores of hides, skins, and coffee were being prepared for shipment (Plate XIII and pages 637 and 640).

In the evening we were visited by an Italian doctor resident in Ta'izz. He told us about the success he had had in antimalarial work, especially after he had obtained permission to put oil films over the sacred pools in the Hodeida mosques. These pools are the chief breeding places of mosquitoes in the cities.

Rich, Cultivated Land Needs Irrigation

It was our intention to leave for the interior early the following morning, but when permission was granted we first visited the large, beautiful, landlocked harbor north of Hodeida. The Yemenis have made some efforts to develop it into a modern port. At present large ships have to stand far off the Hodeida water front and are loaded and unloaded by dhows and small boats (page 638).

It was still early when we bade farewell to our hosts and drove inland. For many miles the way was mostly desert, and then gradually we came upon cultivated land like that between Bait al Faqih and Hodeida, with fields separated by banks of dirt, some of them several yards high.

The fields through which we traveled were being readied for planting grain, but the crop would have to be raised with the moisture collected from only a few rains. Some of this land in the Tihama, or coastal plain, must be very rich, and if irrigation were available its yield should be much higher than at present.

Within an hour and a half we were crossing large wadis and climbing a few foothills with the big mountains plainly in view. The road became very rough and for long stretches it lay along boulder-strewn stream beds.

Scrub trees grew in the hills, and soon we began to see more of the stumpy, bottlelike frankincense tree for which this part of Arabia was once famous. The clusters of trumpet-shaped rose-pink flowers on the tips of its branches made a welcome splash of color here and there against the drab hillside.

The road was heavily traveled, with camels and donkeys carrying huge loads of produce to market from the highlands. Their masters were usually dressed in black, as were the women, who generally wore veils and also tall, broad-brimmed straw hats such as we had not seen before.

At one small town we found that word of our coming had preceded us, and even here our approach was heralded by the sour trumpeting of bugles. The amil came out to greet us with his record books still under his arm, and transacted business in the fashion of Yemen officialdom by scrutinizing and signing little slips of paper brought to him by underlings as we waited.

The ever-present soldiers threatened the crowds that gathered, and beat the earth with sticks within inches of the street urchins' toes. The lads took it good-naturedly.

American Zipper a Thing of Wonder

Continuing to climb slowly, we traveled much more carefully than the drivers would have preferred since we were already far behind the schedule they had set. We were told that the Imam had issued orders in January to recondition the roads for our journey, and in places we could see where vast improvements had been accomplished.

Long after dark we came to a small mountain way station 132 road miles inland, where we put up our cots under the stars and cooked supper over a shepherd's stone-and-plaster stove in a small hovel. A woman and several children looked on in wide-eyed curiosity.

It was stifling hot in the low-ceilinged room, and I took off my jacket. As I "un-zipped" its fastener, the children grinned in startled amazement. I had to repeat the performance several times to show them that their eyes had not deceived them. In Arabia the magic of America is as fabulous as ever the land of Sindbad the Sailor was to us.

Arabs Hungry for News

Outside under the stars and low moon, after supper dishes had been scoured and packed away, I turned on my portable radio set to hear the news. Local Arabs gathered around.

"What news is there?" one asked me.

"Good news," I replied. "The Americans, British, and Russians are winning great victories in Europe, and, in the great ocean in the East, American ships of war and giant planes are moving steadily nearer the island homeland of the Japanese, who dared to start a perfidious war of aggression."

The Arab was silent for a while, leaning on his rifle. "But what news is there of the Arab world? We are hungry to hear the news in Arabic."

Here was hunger indeed, and as I twisted the dial in vain for an Arab program at that late hour, I wondered what might be the consequence to the common man in Arabia should his new hunger for new things be satisfied.

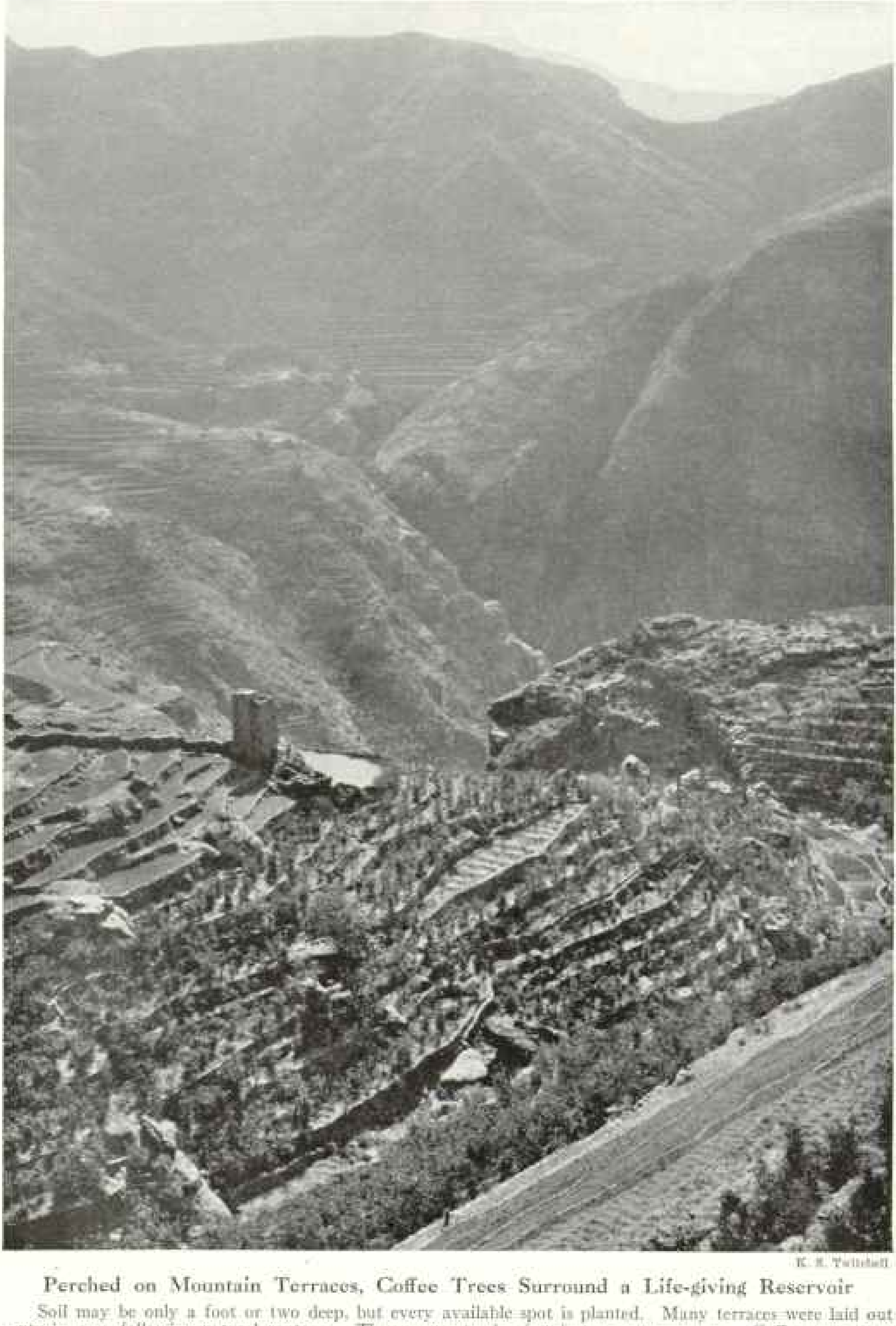
The thin, crisp air at that altitude of several thousand feet above sea level was cold enough to make three blankets necessary for comfort when we turned in.

On the following morning we breakfasted on fruit juice and a kid Sheik Ali had killed and roasted during the night. Monty treated a woman for pleurisy, and we gave the children a few cans of evaporated milk; then we moved off, hoping to be in San'a by nightfall. Almost at once we started up the longest and steepest grade we had yet seen.

The road wound serpentlike up the side of one mountain and down the next, and we were intrigued by beautiful formations of green rock towering above us. Here and there a wadi plunged steeply down in a tumbled mass of smooth rocks of the same bright-green color.

In the valley we were surprised to find occasional fields of short maize growing, and I bought a few dozen ears which we roasted at our next stop, the hot springs resort of Hammam.

Central Yemen is famous for its hot springs and sulphur deposits. The Imam has built



K. S. Twitchell

Perched on Mountain Terraces, Coffee Trees Surround a Life-giving Reservoir

Soil may be only a foot or two deep, but every available spot is planted. Many terraces were laid out centuries ago, following natural contours. They may extend a few feet or cover an acre. Coffee trees grow eight or ten feet high and mature from individually planted seeds in five years.

a small palace above the baths, and there are many crude stone buildings occupied by a throng of visitors and residents. The sulphurous waters were just bearable to the touch, but we decided to forego the doubtful privilege of a hot plunge in these much-frequented public baths.

From Hammam we drove up a fertile valley for many miles, noting crops that included ripening oranges and lemons. Then, as night fell, it began to rain and we stopped to put up the top of the jeep. Mohammed expressed concern, saying that our steepest mountain to date lay just ahead and that rockfalls or a blowout would imperil our lives.

Americans Engineered the Road

I felt it necessary to push on, however, and we started up the long, steep climb in the misty drizzle. Fortunately, here the road showed signs of much recent labor, and we could not help admiring the engineering achievement which the huge abutments and cutouts around steep mountain curves represented. Later we were told the Yemenis had built the road according to plans and surveys left by the American engineers sent by Charles R. Crane in 1927 (page 632).

As we climbed, the way became steeper and the sheer drops from the unguarded edge of the road to our left more precipitous. In places there must have been a drop of almost 2,000 feet, revealed now and then by flashes of lightning (page 641).

We paused at the top, nearly 10,000 feet above sea level, to let the engines cool. Our headlights showed us the freshly plowed fields of the high plateau, which covers thousands of square miles of the high Yemen.

It was less than an hour's drive to Ma'bar, where we were greeted by buglers and a chorus of a song by a row of schoolboys, while a company of Bedouin soldiers stood at attention in the light of lantern and torch.

We met the amil and climbed to the reception room on the third floor of his house. After a delicious meal we chatted with him, and, to the delight of Sheik Ali, tried a few long and not altogether successful drags at the bubble pipe. Then we turned in among the reception-room cushions to sleep.

Early next morning we left Ma'bar and set out on the remaining 50-mile drive to San'a.

Here and there were the typical mountainside towns of substantial stone and mud-block houses we found all through the high Yemen. Above, on the highest peaks, are the castlelike strongholds in which wealthy Yemenis have retired to live in protected security since time immemorial.

The road wound down through a broad wadi and out on the San'a plain. Here trucks summoned by the amil of Ma'bar by telegraph had come from San'a to meet us and take over the bulk of the carryall's load in order to save the tires.

San'a, Where "Everything Is Perfect"

Soon we could see the towers and minarets of San'a rising above the plain before us. We were shown to our rooms on the second floor of our guesthouse and then went to inspect this handsome, well-constructed stone building (Plate IV).

Toilets and other facilities were similar to the primitive ones in other Yemen cities, except that this was one of several buildings with electric lights which operated from current supplied by a generator in the near-by palace grounds.

The building was furnished elaborately. My bedroom was nearly 35 feet long and 20 feet wide. It had Persian rugs, a large canopy-covered bed, and a washstand, table, and several easy chairs. The four large windows were hung with embroidered draperies.

Even more striking was the room reserved for my audiences with official visitors. There were the usual Oriental rugs of varying colors and a dozen overstuffed chairs and four sofas, each covered with silk of distinctive color.

The display was enhanced by draperies and curtains of varying colors, with red predominating. The chair reserved for my use was a tall, straight-backed thronelike seat at the far end of the room opposite the entrance.

The bedrooms assigned to Monty and Abdul were also well furnished, and the dining room, attended by Arabs who had been trained abroad, was large and well serviced.

After a delicious lunch we waited until the palace chamberlain called late in the afternoon to bid us welcome and to bring the greetings of His Majesty, the Imam Yahya, and of the Minister of Foreign Affairs.

This venerable white-bearded man, in immaculate dress, bade me sit in the thronelike chair, with Abdul and Monty on either side, while he and his attendants sat some distance away on chairs along one side of the room.

Although I appreciated this gesture of deference, I felt that this formal and stilted type of conference-holding was out of keeping with the informal character of my visit. Thereafter I met with all my visitors in more congenial fashion around the table in the center of the room.

The pace of life in San'a is slow, but the following ten days there were as busy as any I have known on a tour.

Not without some misgivings, I approved Mohammed's request to have the torn places in our tires reinforced with sections of old tire casings. They were to be bolted into place, in the way the Yemenis repair their own tires. When the tires thus mended were brought to us for inspection, Monty and I marveled at the expertness of the repair job.

The population of San'a is perhaps 50,000, including several thousand Jews who live in a separate quarter (page 654). Since the time of our visit coincided with the Jewish fast period, we had little opportunity to talk with the Jews. It was not until the morning of our departure that their fast period ended and they brought for our inspection and purchase samples of the silver filigree work for which they are famous.

San'a Had Skyscrapers When New York Had Wigwams

Notwithstanding the age-old atmosphere we sensed in the capital of Yemen, certain aspects of the city are strikingly modern. Although its "skyscrapers" are not so tall as in other cities of the old Yemen, when one looks at a cluster of the tall buildings in San'a, appearing for all the world like apartment houses in a New York suburb, one finds it hard to realize that the Yemenis viewed skylines like this when Manhattan boasted only Indian wigwams (Plates IX, XIV, XV).

We were told in San'a of the pre-Moslem king who built a skyscraper "as high as Jabal Nukum," the mountain which soars several thousand feet above the city.

There seems actually to be some substance to the persistent legend that a structure several hundred feet high was once built by a vain king, and that the topmost story had a roof of fine alabaster so clear one could distinguish the shapes of birds flying over it.

The architecture of present-day San'a is substantial and impressive. The buildings are of cut stone fitted smoothly together, or of sun-dried bricks, or both, and vary from two to seven stories in height. Many of them are attractively decorated and have intricate designs in white plasterwork and delicately patterned latticed window openings.

Here and there one sees the old-style alabaster windowpanes, still made in San'a from stone quarried in near-by mountains. The streets are not paved and most of them are narrow and winding, except for broad thoroughfares leading from the main gates. The thick stone and mud wall that completely surrounds the city must be 40 feet high, and it is buttressed by watchtowers approximately every 200 feet (Plate VIII and page 642).

Our tours on succeeding days took us to the mountainside near San'a where famous almond groves and apricot orchards grow, and to the summer palace of the King at Ar Raudha, a few miles from San'a. There we lunched amid vast vineyards and orchards of all manner of fruit trees (page 656).

We also went to the famous Wadi Dhahr, where much of the citrus fruit of the high Yemen grows and where ancient buildings, including a kingly palace, perch on a high rocky promontory overlooking as fair a valley as I have ever seen (Plates XII-XIII, and page 635).

Perhaps our most interesting visits were to the palaces the Imam has built during the relatively brief period in which he has ruled independently from San'a. The Imam, who is now 81, has been in poor health for several years, and in accordance with my suggestion Dr. Palmer was the first to see him.

His Majesty was so favorably impressed that he asked Monty to visit his harem and treat two members of the royal household, who were under the care of an Italian doctor left by the Fascist medical mission to Yemen.

On the following day I was received by Prince Saif al-Islam Abdullah, who nominally administered the Government (page 672). The chamberlain escorted us to the palace grounds, where we were admitted through a massive gate. We were not taken into the Central Palace but were escorted up a stone stairway and along a passageway in the outer wall around gardens on the northern side of the grounds.

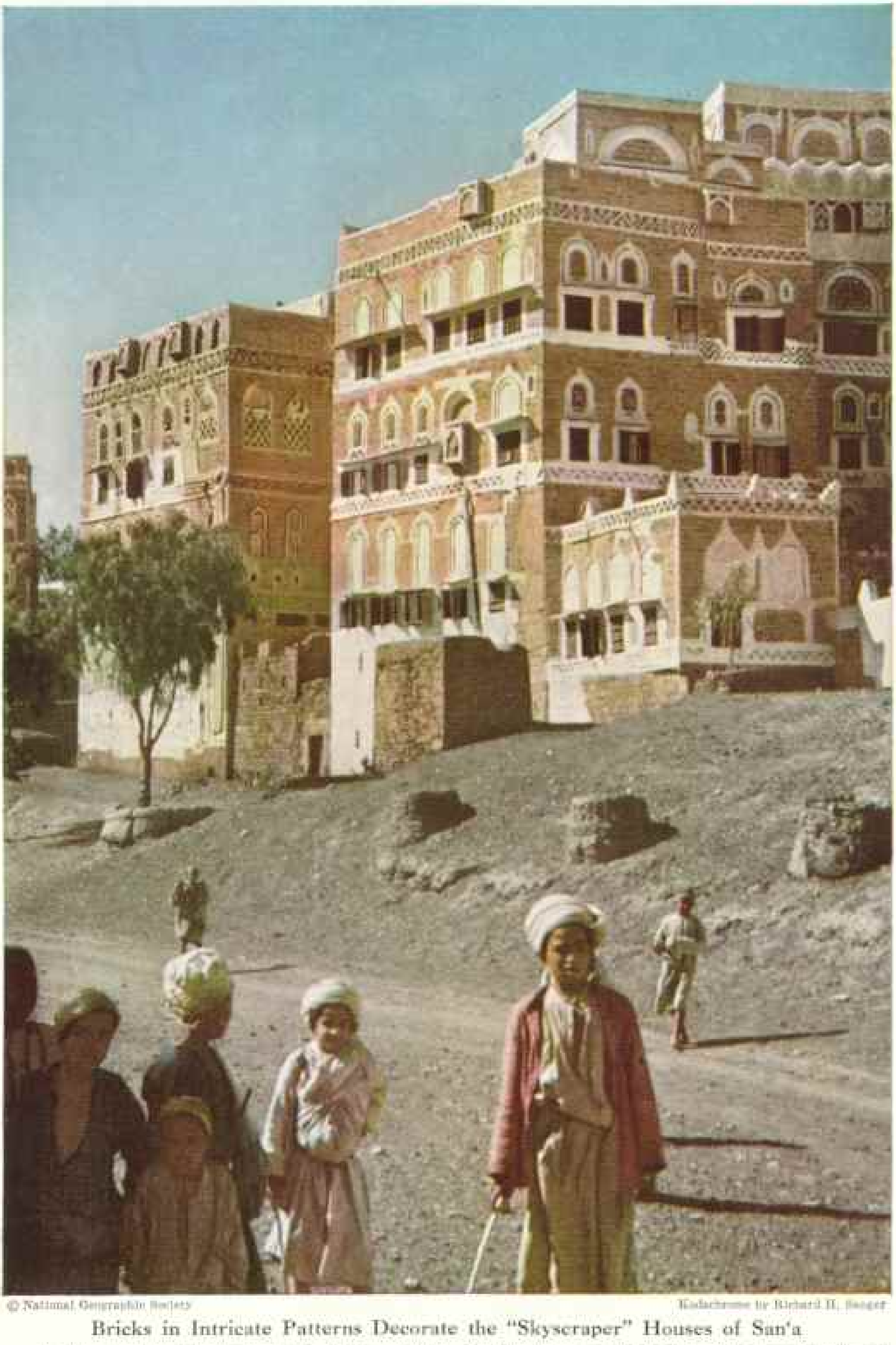
Shoes Removed Before Entering

Taking off our shoes, we entered a reception chamber walled in on three sides and opening upon a patio on the fourth side, a sort of "hanging garden" with a large fountain and flower terrace on the same level and a big garden with many varieties of trees, flowers, and shrubs below. The Persian rugs and cushions seemed somewhat richer than in other reception chambers we had visited.

The Prince, who rose to greet us from his place among the cushions in the center of the room, bade us welcome and spoke earnestly of the fame of the United States and its reputation as a defender of the rights of small nations. He showed a wide knowledge of events in the outside world, including the progress of the war.

When we left, the Prince said he hoped the relations between Yemen and the United States would always be close and friendly and that we would return often to his country.

The next day we were invited to return to the palace grounds, where, in the old Central

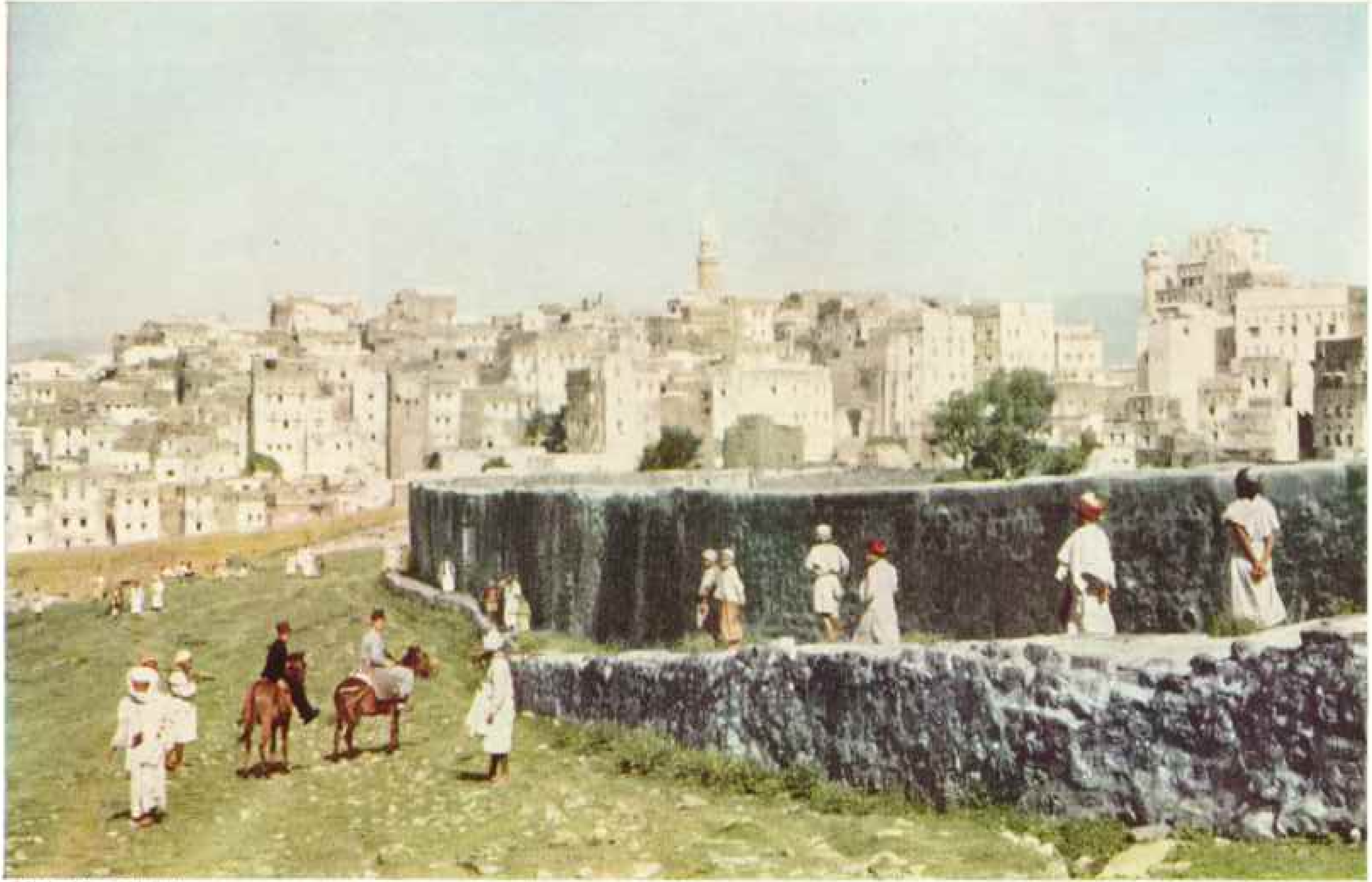


© National Geographic Society

Kodachrome by Richard H. Sanger

Bricks in Intricate Patterns Decorate the "Skyscraper" Houses of San'a

Freshly applied whitewash gleams in the sunlight. Stained glass or translucent alabaster windows add to the ornamentation. Dark basalt often forms the lower stories, with the sun-dried brick placed above, Rooms usually are long and narrow. The round stone objects (center) once contained trees.

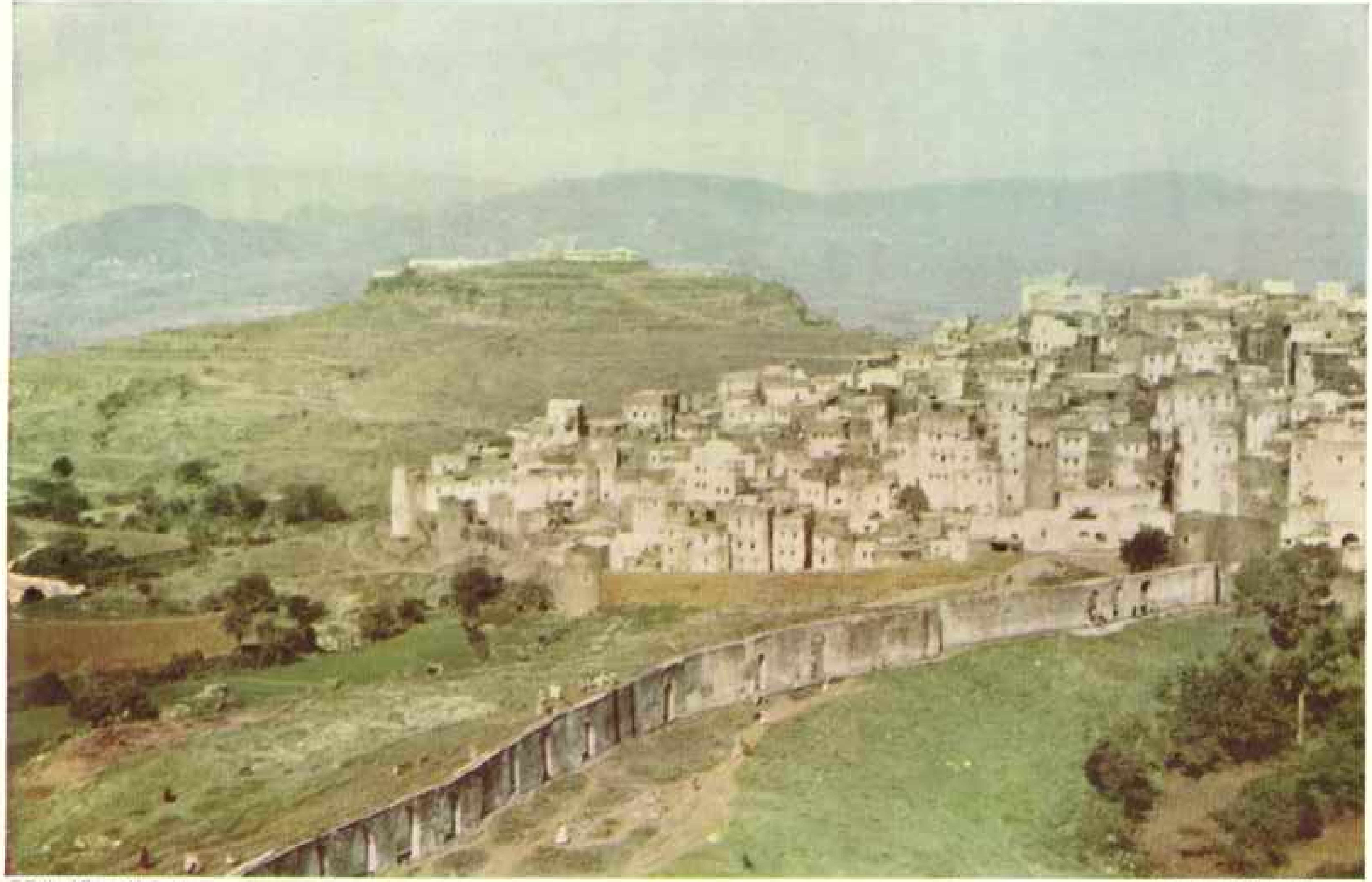


© National Geographic Society

Kodachrome by Richard H. Sanger

Seven-story Buildings Dwarf the Ancient Wall of Ibb, Standing on a Ridge Which Forms a Mountain Pass

The author and his youthful interpreter (left foreground) approach on mules because automobiles cannot reach the town, even though it lies on the main route between San'a and Ta'izz, home of the Crown Prince. The latter sent a servant, canned foods, and chairs to Ibb by camel caravan for the comfort of his American guest.

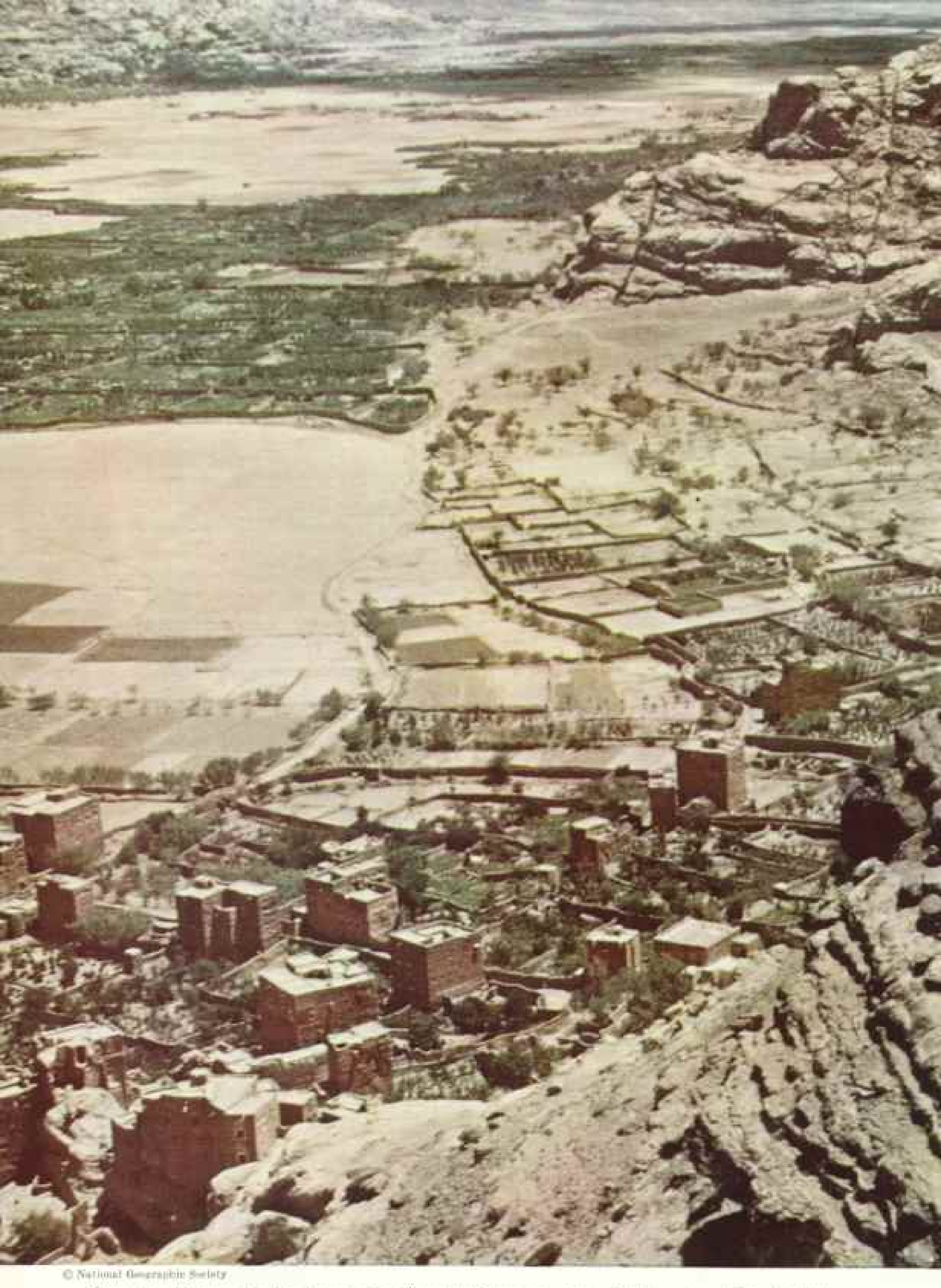


© National Geographic Society

Kodachrome by Richard H. Sanger

Amid Cultivated Fields, a Fortified Hill Protects Ibb's Closely Massed Houses and Battlements

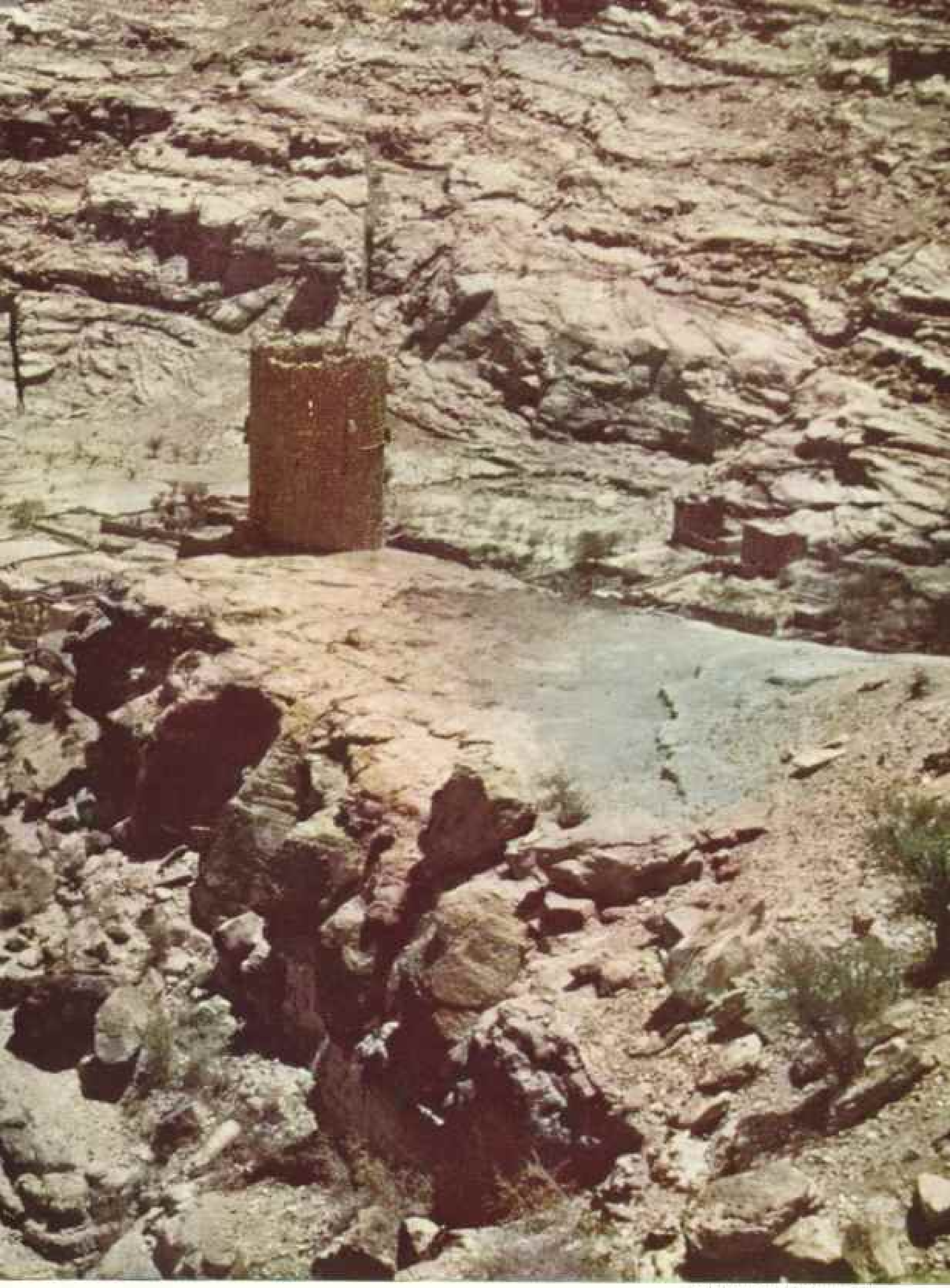
Extremely narrow streets run between the tall, slightly tapering structures. The aqueduct (foreground) brings fresh water from a mountain spring. This is the most fertile part of the southern Yemen. Nearer the Red Sea, the land changes to a sandy desert.



© National Geographic Society

Summer Homes of the Imam and Wealthy Subjects Line Well-watered Wadi Dhahr

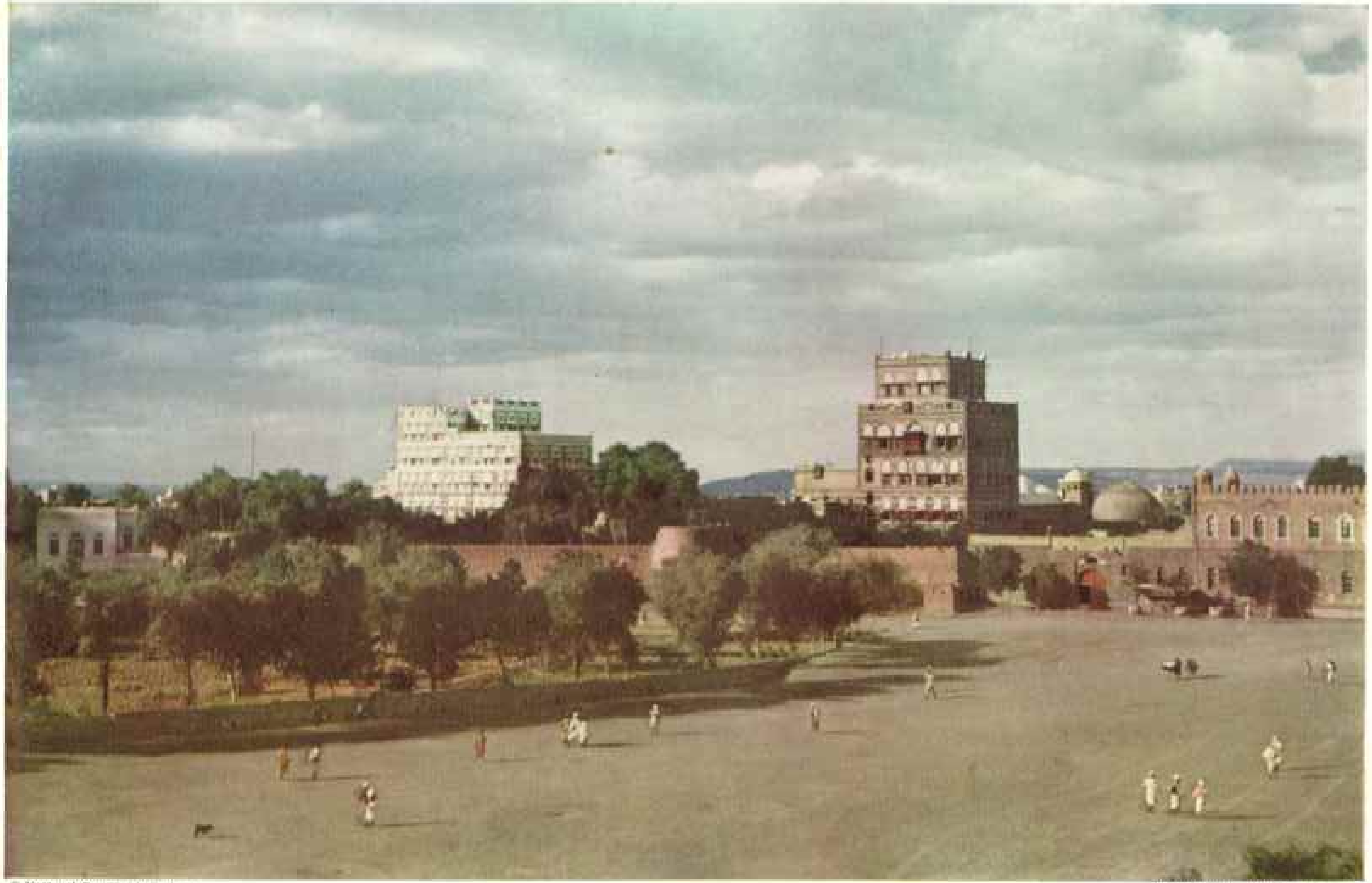
The climate is cooler than on the San'a plain six miles to the southeast. Grapes and citrus fruit, particularly sweet limes, grow abundantly in walled gardens.



Kodachrome by Richard H. Sanger

Guarding the Southern Entrance, a Watchtower Dominates the Canyon Slopes

Many highland villages are virtual fortresses, built at the sharp edges of mountains for extra protection. They shun well-traveled highways.

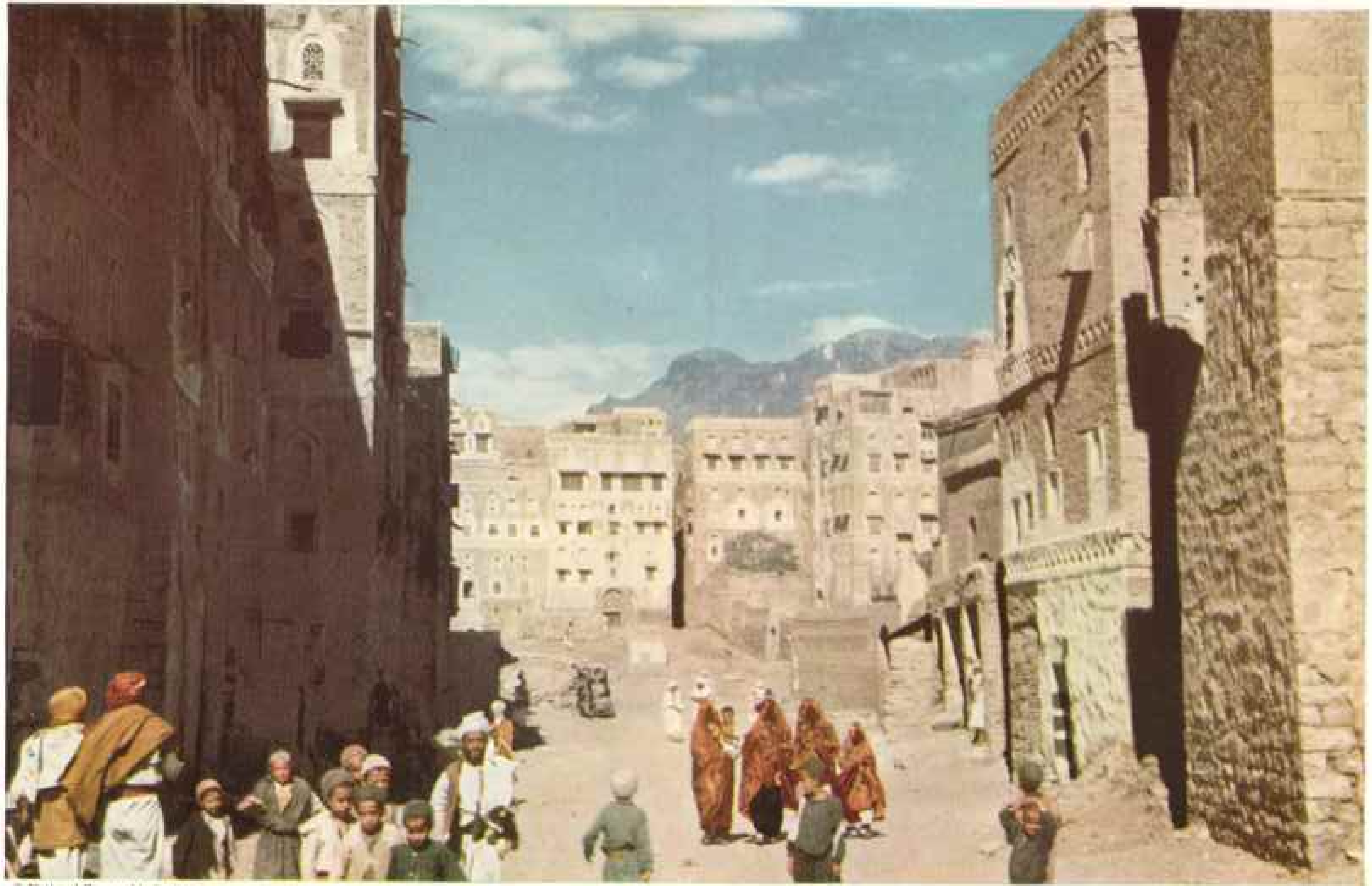


© National Geographic Society

Kodachrome by Richard H. Sanger

Palace of Joys (Left) and Palace of Thanks Overlook San'a's Royal Compound and Surrounding Gardens

Oriental rugs, rich hangings, and piles of cushions decorate the reception rooms. Electric lights have been installed. Fountains and flowers fill the patios. In the age-old Central Palace the Imam, wearing white robes, silken turban, and woolen socks, talked with his American visitors.

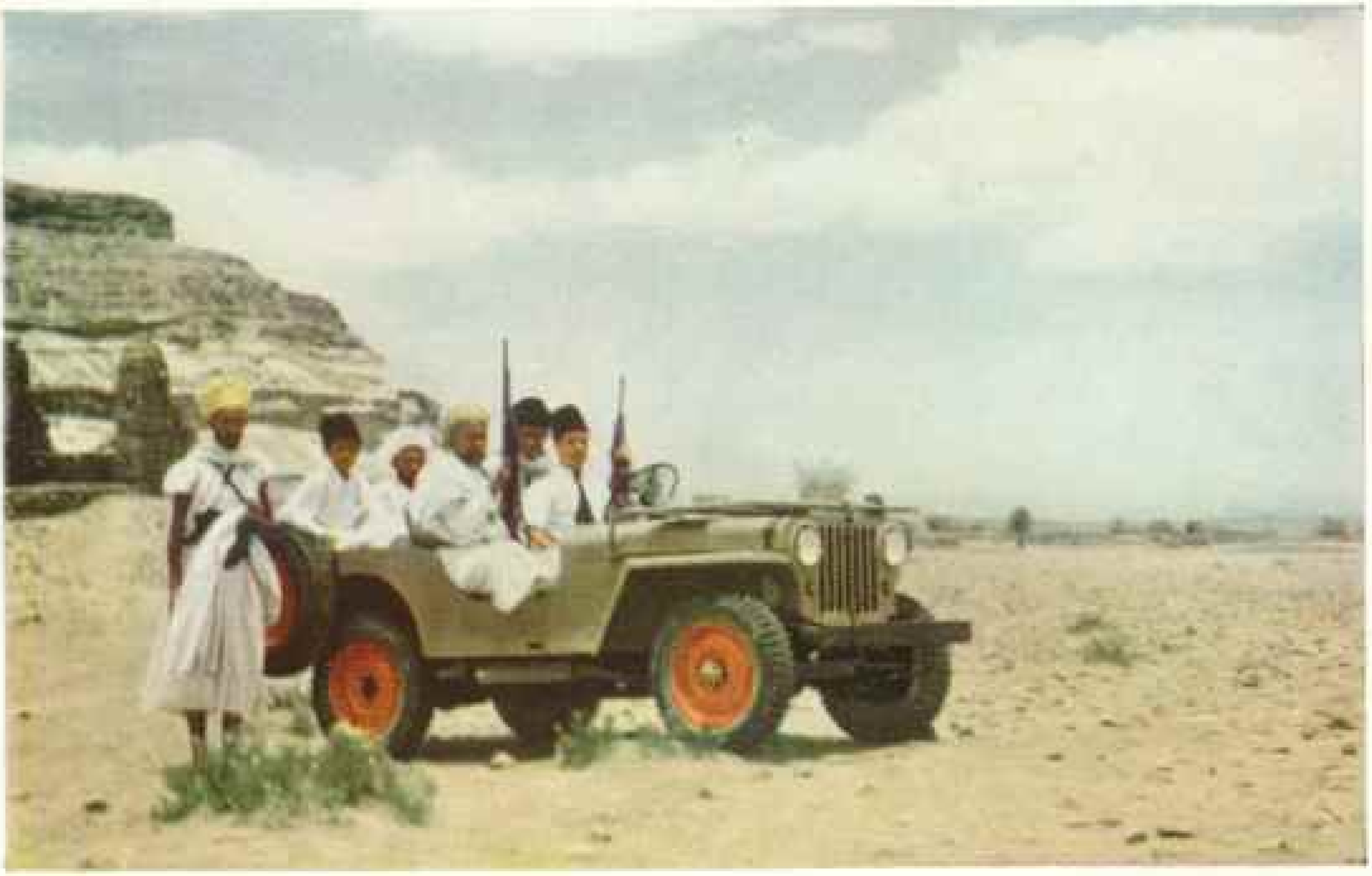


© National Geographic Society

Kodachrome by Richard H. Sanger

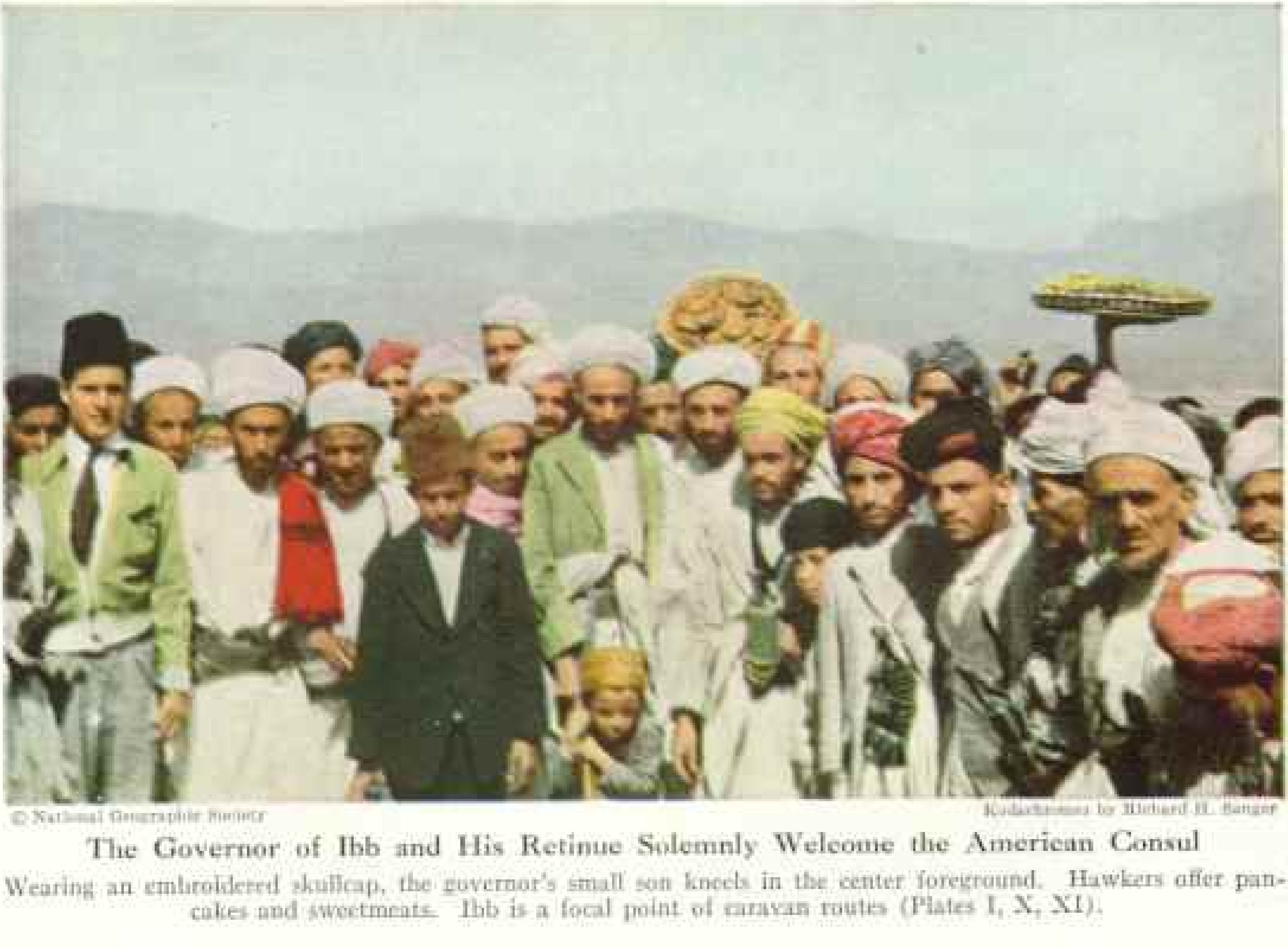
Veiled in Bright Textiles, Three Yemeni Women and a Girl Saunter along a Main Street in San'a

The capital's lofty buildings look like modern apartment houses, but many were old when Indian wigwams lined Manhattan. Legend says an early king erected a skyscraper as high as Jabal Nukum, the mountain towering in background. Eight thousand children attend school in San'a.



A Modern American Jeep Passes an Ancient Well (Extreme Left) on the San'a Plain

Sheik Ali Gaheri, on the front seat with the author, was sent by the Imam as a guide for the entire journey. Black caracul caps are standard headgear for foreign visitors to the Yemen.



© National Geographic Society

Kodachromes by Richard H. Sanger

The Governor of Ibb and His Retinue Solemnly Welcome the American Consul

Wearing an embroidered skullcap, the governor's small son kneels in the center foreground. Hawkers offer pancakes and sweetmeats. Ibb is a focal point of caravan routes (Plates I, X, XI).

Palace (Plate XIV), we were received by two more sons of the Imam, Prince Hussein and Prince Qassim, and then finally by His Majesty himself.

Prince Hussein was an affable man, slim and dark, with a quick smile and bright eyes. He had traveled extensively in Europe and the Far East and said he had hoped to visit the United States, but the war had intervened.

Prince Qassim was a jovial-faced man with a pleasing personality. He took little part in our conversation, but left the discussion to his more widely traveled brother.

While we were chatting pleasantly over the usual little cups of Mocha coffee, there was a sudden flurry of attendants and we were bidden to proceed to the royal reception room; the Princes rose hastily to obey.

The Imam was seated among cushions halfway along the left-hand side of the wall of the long, narrow room, and Prince Abdullah and several people were similarly seated at the far end of the room.

The Imam Himself Grants Audience

His Majesty greeted Dr. Palmer and me graciously and seemed to be in a pleasant mood. He bade us sit opposite him, across the room. His presence was more commanding than that of any of the other officials we had met, and I could see that reports I had heard of his charm had not been exaggerated.

His clothes were not pretentious—silken turban and white robes, with woolen socks showing. Yet here was one of the last absolute monarchs in the world, and he rules with a firm hand.

He bade me welcome to his country and said he was happy to have in our visit this token of friendship between our two nations.

We were greatly impressed by the small museum in San'a and by the Imam's new school system. The former afforded us a brief but illuminating glimpse into the glorious past of Yemen. The latter, which we were the first Americans to visit, showed us what fine potentialities it has in the way of human resources for future development.

Our visit to the San'a schools was arranged by the director of education. He said that there were 50,000 students in Yemen and that the Imam was interested in extending his educational system. There were 8,000 students in San'a, including several thousand orphans and some sons of minor officials from outlying regions, the latter sent by their fathers to the capital as a mark of their fealty to the Imam and kept there at the expense of the royal treasury (Plate V and page 671).

We saw most of the thousands of school children in San'a, except the few hundred girls being educated in separate schools.

In age the children ranged from five or six to possibly 18 years. From each class pupils had been selected to demonstrate to us their proficiency in writing, reading, the Koran, bookkeeping, poetry, geography, hygiene, agriculture, music, history, and mathematics. Only a few of the teachers had traveled abroad.

Democratic Schools under Absolute Monarchy

One of our discoveries was that the Imam's youngest son and several sons of the Princes were sitting in the same classrooms with commoners. When I remarked on this afterward with approval, officials invariably said, "Of course. Islam is very democratic."

There were a few Europeans in San'a, including a German, two Italians, and a Russian. The Italians were remnants of the Italian medical mission; the other two assisted the Imam in his factory and weaving mill.

The most interesting foreigner in Yemen is the Turk, Qadi Raghib Bey, who remained in San'a after World War I to act as the Imam's adviser on foreign affairs. For years he has held the title of Minister of Foreign Affairs and has conducted the negotiations which have led to the conclusion of the Imam's treaties with the other great powers.

When the time came for our departure, we said our farewells with regret. The Imam had granted our wish to return via Yarim and Ibb, and we set out on the morning of April 7, returning first to Ma'bar over the same route we had traveled ten days previously.

We lunched at the house of the amil and then sent the jeep and carryall on to Hodeida, while we turned southward toward Dhamar. The Imam's Ford sedan was reserved for our journey to Dhamar and Yarim, a truck following with our luggage.

As we drove over the broad highland plain, we were amazed to see how vast an area of fertile land it covered.

We passed the night in Dhamar, a city of 40,000, in the middle of a large grain-growing district. When we left it the following morning, six superbly mounted Arab horsemen rode before us in an exhibition of horsemanship such as we had not seen anywhere else in Arabia. Holding their rifles high in the air and screaming shrill Arab war chants, they raced for several miles before they finally drew up and waved us good-bye.

After lunching at Yarim, we managed—though only after much difficulty in overcoming the protestations of the amil—to take our departure for El Dherba, some ten miles

Alfred M. Palmer

"Shoulder Arms!" Playing Soldier, a San'a Boy Shouts His Own Commands

to the southwest, where we were to leave the cars and proceed on horseback. Four fine horses, three donkeys, and one mule were waiting for our use.

At once we commenced a steep ascent around the brow of a mountain over an ancient rock road which we were to follow nearly the whole distance to Ibb. Since the horses panted at the strenuous going, Monty and I got off to walk part of the way to spare them. A party of soldiers who accompanied us went on foot, and trotted thus clear across the mountains until we finally left them days later near Ta'izz.

A Magnificent View from a High Pass

Below and behind us lay the most beautiful terraced countryside we had yet seen, with green fields and tilled patches extending in geometric patterns for many miles to the north and east; but a still more wonderful sight rewarded us after we had completed the hour-long climb to the top of the pass.

Behind us the towering mountain of Jabal Samara rose perhaps a thousand feet above the pass on which we stood. Below us was a magnificent wadi whose terraced sides tumbled precipitously for thousands of feet, with crops which we took to be kat and coffee growing on every vantage point.

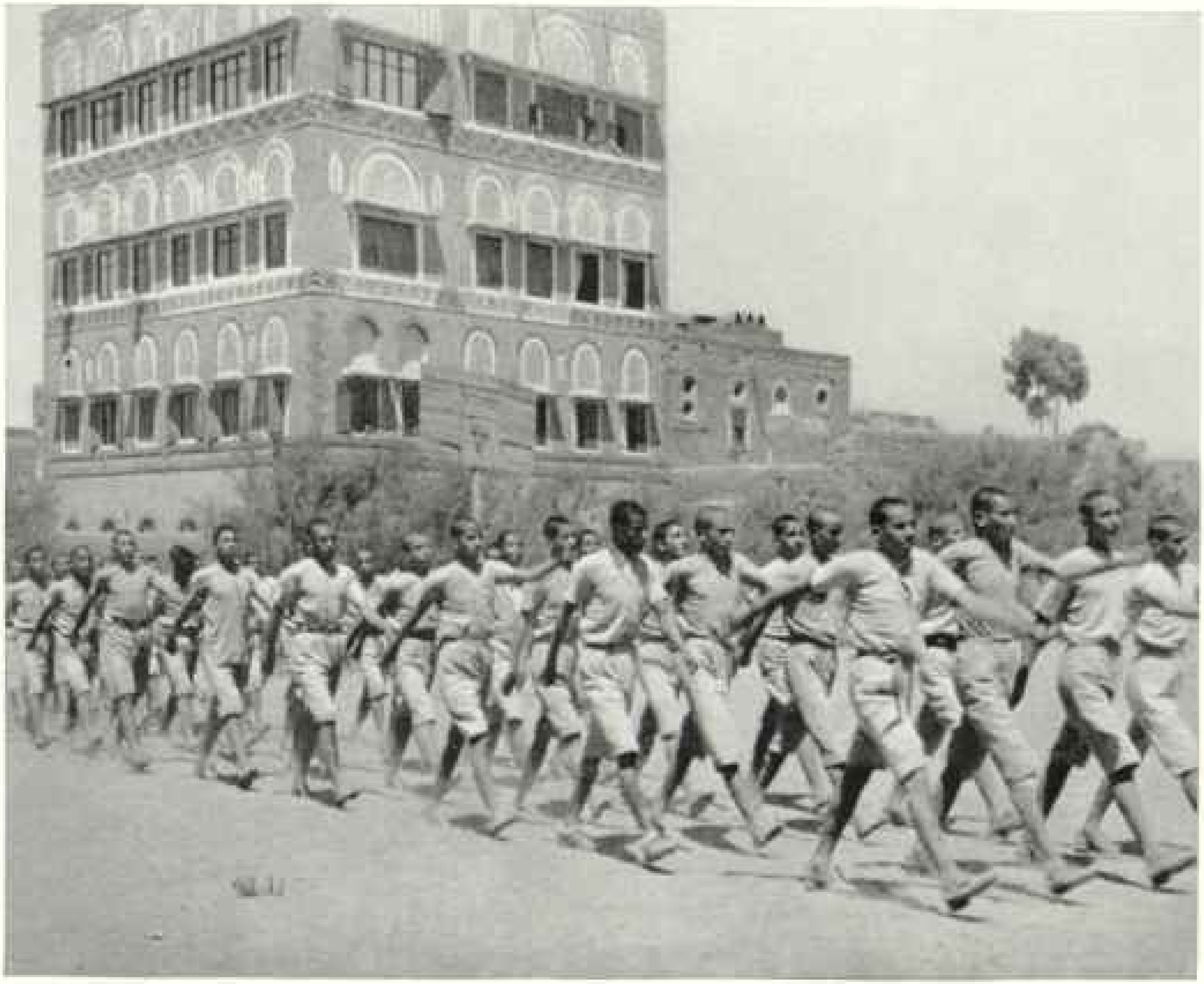
A dozen villages were in plain view on the mountain peaks and promontories.

It was dusk when we stopped at the little mountainside town of Menzil and set up our cots on the roof of an inn. Darkness brought a deep chill down from the open sky, making us glad we had some extra blankets. We crawled into bed with all our clothes on, even our hats.

About midnight we were awakened by calls from the valley, and soon a party of Arabs on foot filed up to our inn, carrying lighted pressure lanterns. We were amazed to hear in the morning that they had been sent to meet us all the way from Makhadar, our next stop, by the amil of that town.

As we started on, we walked at first, for the slopes were too steep for safety on horseback.

Before long we saw pretty terraced areas planted in kat and coffee, and groves of trees,



Alfred M. Palmer

Long-legged San'a Schoolboys with GI Haircuts Stride down a Recreation Field

Yemen's 50,000 pupils include several thousand orphans and some sons of minor officials whose education is paid for by the royal treasury. Classes in San'a range from 96 pupils in lower grades to 12 in advanced bookkeeping and algebra. The Imam's youngest son and several sons of Princes sit beside commoners (p. 669).

including citrus, peaches, mangoes, and figs, as well as banana plants and fields of corn, cotton, and long-bearded wheat. We often came upon fields of potatoes in the high Yemen, and farmers told us that they rotated their crops every growing season, planting first wheat, then millet, then beans and similar crops. And this scientific basis of farming had been known for many, many centuries!

After two hours' ride across poor, rocky land we saw the town of Makhadar, with the usual large crowd out to welcome us, including the amil. Our attention was attracted to a stone aqueduct carrying spring water into the town; Sheik Ali said it had been built by a Yemen queen in ancient days.

The sun was hotter at this lower level than we had experienced it for two weeks, and we enjoyed a pleasant two-hour stopover at the amil's fine residence.

Sheik Ali would have preferred to chew kat and smoke the hubble-bubble, but we pushed on after lunch by muleback, since the going was too rough for any horse. Finally we saw Ibb, perched like a magic white-walled city out of storybooks high on a mountainside ahead of us, and climbed for an hour up an ancient roadbed whose stones were worn smooth by centuries of use. The entire road was heavily traveled, and we saw caravans with gasoline and other supplies from Aden.

The steep ascent before Ibb and the substantial city walls and battlements guarding the last heights gave the city the appearance of a well-nigh impregnable fortress.

Our guesthouse was a large stone building on a hill south of the town. When we turned into its courtyard, we were surprised to find the smiling servant, Ismail, whom the Crown Prince had sent all the way from Ta'izz to serve us. He had also sent canned foods and chairs for our comfort, by camel caravan. We settled down, weary and sore from our bouncing muleback ride, but were soon refreshed

AP from Press Ass'n

President Truman Confers with a Visiting Prince of Yemen

Prince Saif al-Islam Abdullah, sixth son of the Imam, and Yemen's first official representative to visit the United States, came here in July, 1947, to discuss trade prospects and to consider purchase of equipment for building roads, electrical plants, and harbor facilities. He delivered to President Truman a letter from the Imam. His visit, he said, was a "symbol of what the Yemen King and his people have in their hearts for the great United States." The two countries established formal diplomatic relations in 1946. Prince Abdullah also acts as Yemen's representative in the Arab League at Cairo.

by a cooling drink and by the splendid view of the terraced mountainside to the west.

In the morning we had our first bath and shave in several days and were pleased to learn that Prince Hassan would receive us at once at his palace within the city walls.

The Prince seemed pleased to see us and talked with us for an hour and a half. He showed a good knowledge of the part being played by the United States in the global war and of other phases of international affairs. He said he would like to visit the United States and hoped for close friendship with our country.

After our chat with the Prince we walked through Ibb, in narrow, crowded streets among the rows of tall stone buildings that shone fiercely in the sun and cast knife-edged shadows across the canyons between them (Plates I, X, XI, XVI).

Following a restful night in Ibb's clear mountain air, we started off early in the morning on our five-hour trip to Sayani, where we were to meet the Crown Prince's cars that would take us the remaining 25 miles to Ta'izz.

Our way led over some of the steepest trails we had yet followed. First we climbed to another very high pass, where horses labored in the thin air, along terraced plots where potatoes and other crops were growing, then down through a forlorn wadi, like a devil's canyon, worn and scored by torrential downpours during rainy seasons of many a century.

We went on foot down the last few miles of precipitous descents until we finally came upon the cars at the way station of Sayani.

A hot lunch was prepared for us, and we relaxed while Sheik Ali recounted our adventures to the emissaries of the Crown Prince over the hubble-bubble.

Among the hardy soldiers who had traveled so far on foot, I distributed a small bag of silver dollars. It is hard to say how much we were indebted to them, for their continued presence had served as a kindly guarantee of hospitality in this ancient, changing land.

Unlocking Secrets of the Northern Lights

By Carl W. Gartlein*

EVER since Bible times, and probably much further back in history, people have been awed, thrilled, and often frightened by the beautiful and sometimes disturbing spectacle of the polar aurora.

Men have thought that the glowing, dancing, rippling arcs and streamers of light in the sky, often called in our hemisphere the "northern lights," were the battles and maneuvers of spirits or gods, portents of evil tidings, or even warnings of the end of the world.

When I was a boy in Indiana, people used to say that the aurora was a reflection of sunlight from the faraway ice fields of the Arctic. No one stopped to think that for months at a time during the long night of the polar winter sunlight does not fall upon the ice fields of the Arctic, although the aurora is visible then as much as at other times; so this explanation could not possibly be true.

The Causes of the Aurora

Today we know what really causes the aurora.

Its gorgeous display is produced by a process of Nature so dramatic, vast, and awe-inspiring that the old legends and superstitions seem pale by comparison.

Picture to yourself gigantic streams of electrified particles spouting forth from the faraway sun and speeding millions of miles out into space like streams from a gigantic hose. Sometimes they pour out for weeks at a time.

As the sun revolves on its axis, these huge streams sweep around through space much as do the jets of water issuing from a rotating lawn sprinkler. Every so often one of them catches the earth in its path, and then for hours or days our planet is drenched with this shower of electrified particles.

When one of these streams approaches the earth, it encounters an invisible field of magnetic force that forms a sort of nebulous envelope extending out thousands of miles around the earth. It is exactly the same kind of field of force that exists around an ordinary horseshoe magnet and is what guides compass needles toward the north.

This magnetic field diverts most of the onrushing sun particles toward the north and south polar regions (diagram, page 680). There they speed down into the upper part of the earth's atmosphere and collide with atoms of the rarefied upper air.

The collisions excite the atoms so that they give off light, setting up a glow which can be seen from the earth far below.

This glow is the aurora.

A Faraway View of the Earth

If you could see the aurora from out in space, it would appear like two luminous clouds near both Poles on the dark side of the earth, hundreds or even thousands of miles in length and breadth. At times it may extend 600 miles or more up into the atmosphere.

Auroras may consist merely of ill-defined patches of light or may be in the form of streamers, arcs, straight or wavy bands, rays fanning out from a center, or "curtains" of light which seem to hang downward. One of the rarest forms is the corona, which appears close to the zenith (Plate IV and page 694).

In most auroral displays the light is greenish white, but in brighter displays it may be yellowish, greenish, or red. In some cases the light forms are stationary; in others they change slowly or rapidly in position, in brightness, or in color.

A vivid description of an unusually fine aurora in 1866 is given by George Kennan in *Tent Life in Siberia*, G. P. Putnam's Sons:

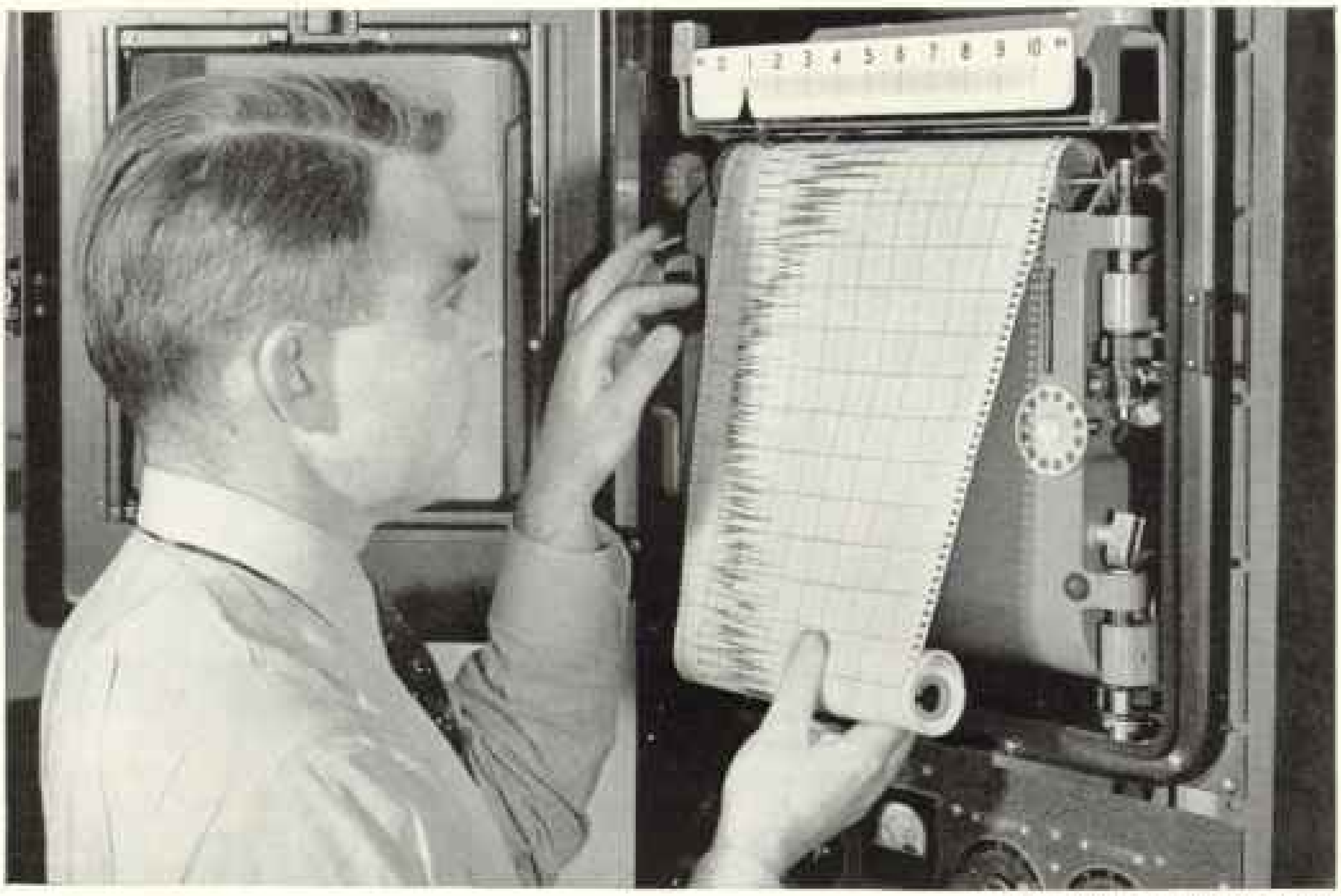
"The whole universe seemed to be on fire. A broad arch of brilliant prismatic colours spanned the heavens from east to west like a gigantic rainbow, with a long fringe of crimson and yellow streamers stretching up from its convex edge to the very zenith. At intervals of one or two seconds, wide, luminous bands, parallel with the arch, rose suddenly out of the northern horizon and swept with a swift, steady majesty across the whole heavens, like long breakers of phosphorescent light rolling in from some limitless ocean of space."

Our primitive ancestors were more right than they knew when they believed that the aurora was a portent of trouble, though it portends a kind of trouble far different from any they ever imagined.

The same showers of particles that produce the aurora also produce what we call "magnetic storms," which can and often do make radio, telephone, and telegraph communications impossible or at least highly unreliable for hours. So the communications engineer feels a little unenthusiastic about the beauty of the aurora's lights, for he knows they are a symptom of something that means only difficulties for him.

---

* Dr. Gartlein is director of the National Geographic Society-Cornell University Study of Aurora, carried on since 1938 at Cornell, where he is a member of the Department of Physics.



Staff Photographer Robert F. Sisson

How Are Radio Signals Behaving? If His Chart Shows a Fade-out, an Aurora Is Due

Intensity of radio signals reflected from the ionosphere is recorded continuously on a moving strip of paper by this machine at the experimental station of the Carnegie Institution of Washington, Derwood, Maryland. When the chart shows a sudden disappearance of the signals, it indicates that a flare-up of light and a stream of particles have erupted on the sun near a group of sunspots. The light reaches the earth first, causing the radio fade-out, and this is a tip-off that within 24 hours the slower-moving particles will strike the earth, causing auroras and magnetic storms, with disturbances of radio and wire communications.

Magnetic storms have no connection with storms associated with weather. They disturb the ionosphere, the electrified region between 50 and 250 miles above the earth which reflects radio signals and enables them to travel long distances. When the reflecting layers of the ionosphere are disrupted, long-distance radio communication becomes difficult or impossible over many routes.

A Magnetic Storm May Affect Your Morning Newspaper

Magnetic storms also upset the electric currents that run through the earth itself, causing trouble on telephone and telegraph lines. A teletype message which has been coming in smoothly to a newspaper or telegraph office suddenly becomes hopelessly scrambled.

During a recent magnetic storm two different telephone conversations between people in New York who believed that no one else could hear them were somehow transposed to a radio program to which millions of people were listening!

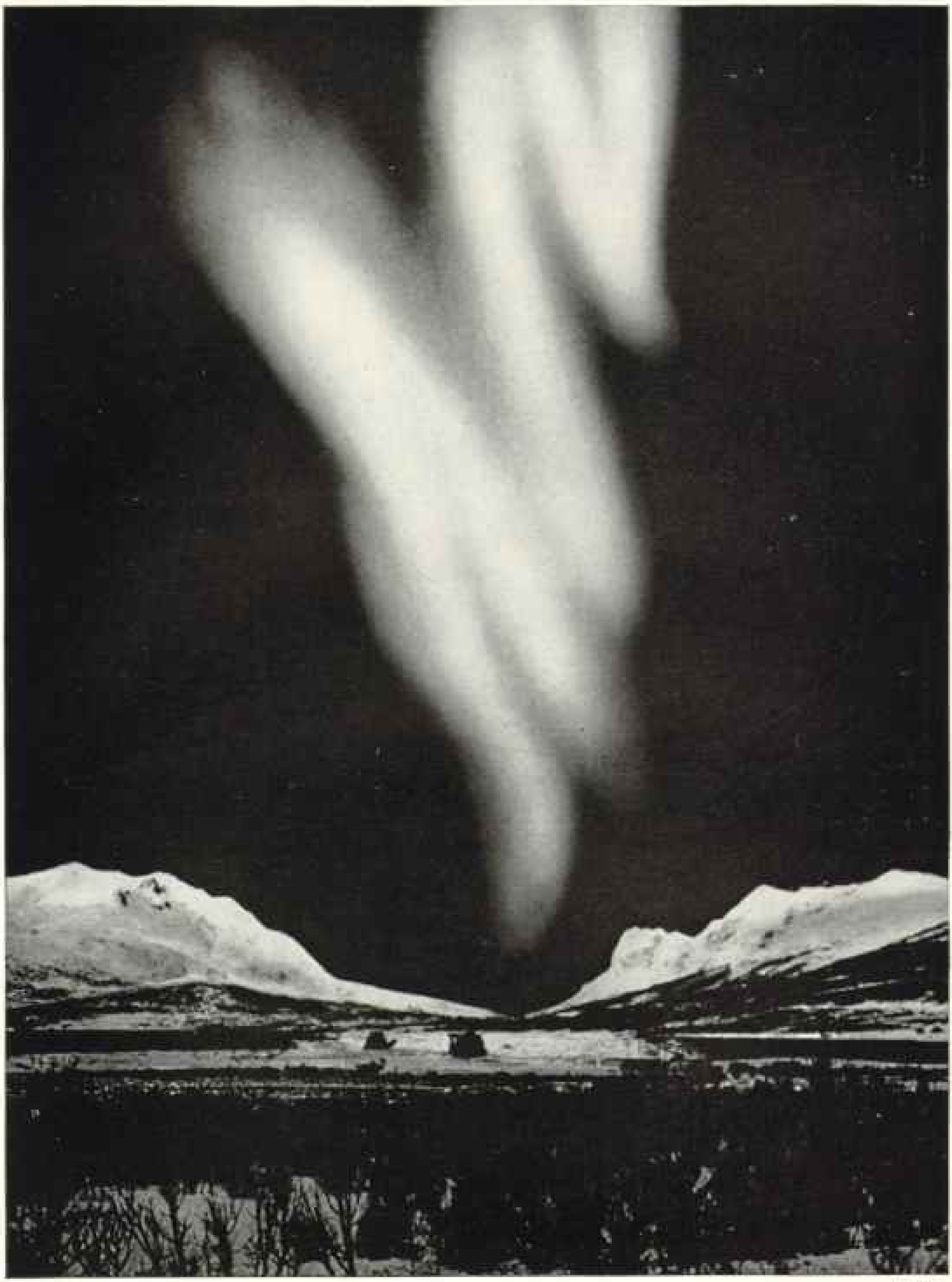
Man is almost helpless under the onslaught of a severe magnetic storm. Once during World War II, when President Roosevelt wished to call Prime Minister Churchill by radio-telephone, the White House operator was told all transatlantic circuits were out.

"But it's President Roosevelt calling!" the White House operator said.

It took a few minutes to convince her that a magnetic storm is no respecter of rank, and the call had to wait until the storm subsided.

Fortunately, if we have warning of a magnetic storm, some of its bad effects can be avoided. Radio messages can be rerouted to by-pass disturbed portions of the ionosphere, and land communications lines can be protected temporarily against disturbances.

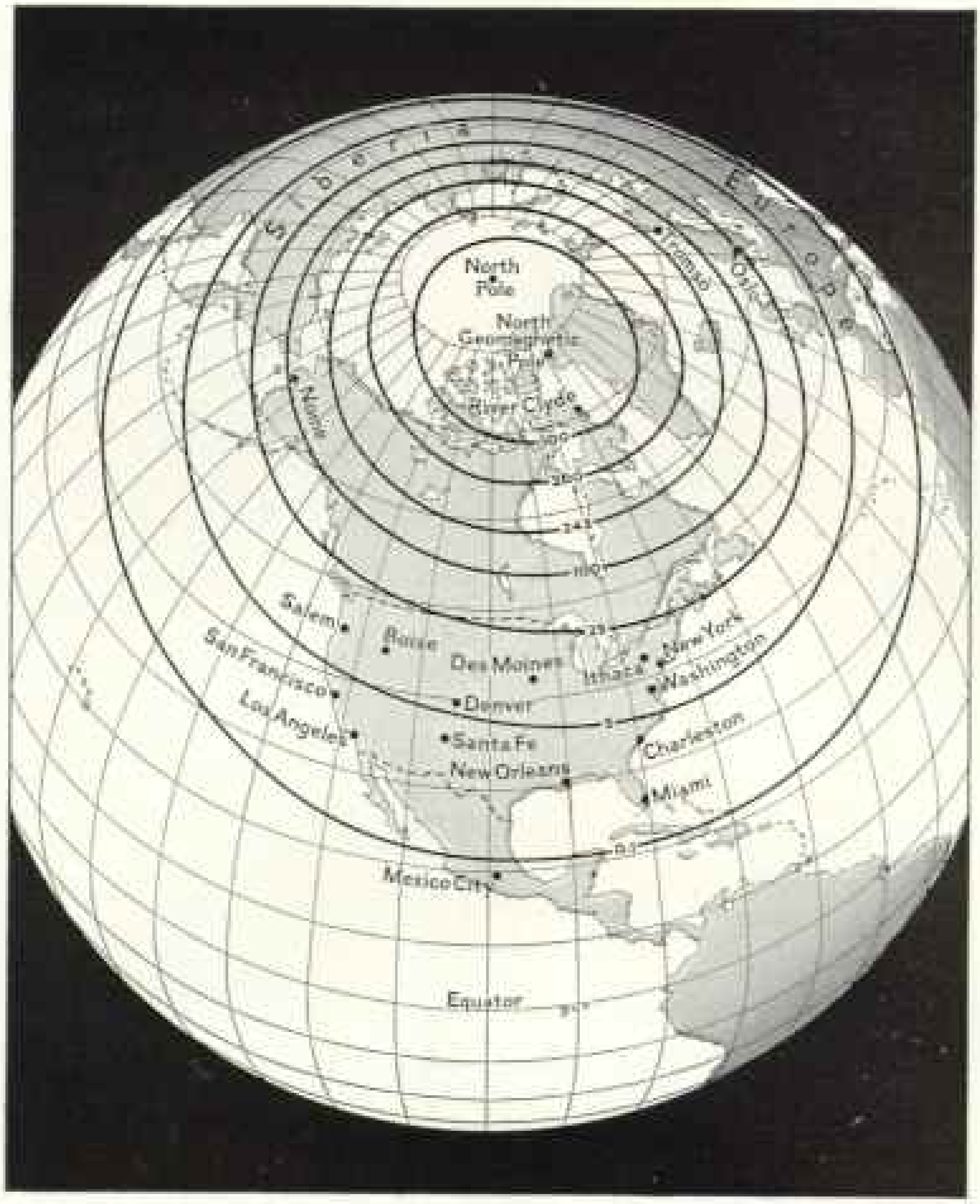
That is one important reason for studying the aurora. It serves as a tip-off on magnetic storms, because it is produced by the same thing that causes the storms. It gives both short- and long-range warnings. If we first see an aurora one night, we know it is almost certain to take place again the next night, and so we can expect the magnetic storm that goes with it to last at least that much longer.



Fix-Illes

Band-type Aurora Stages a Brilliant Show over Snow-clad German Mountains

In this display the bands fold over into one another. A bright aurora lights up the landscape at night about half as much as the full moon. Folds of the band type sometimes resemble a large curtain. The homogeneous band type may vary from narrow to very wide. The lower border is often irregular and sharply defined.



Drawn by Harry S. Oliver

Auroras Are Most Frequent in Northern Canada and Siberia, Not near the North Pole

Lines on this map, based on average data from 1700 to 1942, show the zones in which auroras are seen in the Northern Hemisphere. The numeral on each line indicates the approximate number of days per year on which auroras are visible in that zone. Occurrence of the aurora borealis increases northward from one in ten years in central Mexico, the Mediterranean, and southern Asia to 243 a year in northern Canada and along the Arctic coast of Siberia. It decreases to 50 a year around the geomagnetic pole in northern Greenland (page 684).

Moreover, because the sun rotates in about 27 days, we know that the stream of particles causing one aurora and magnetic storm is likely to move on around and catch up with us again in about that length of time, producing another aurora and magnetic storm.

New World of the Upper Air

Auroras also play a part today in the exploration of the new world of the upper air, which is assuming ever greater importance as we penetrate farther and farther upward with high-flying aircraft, rockets, and long-distance radio signals.*

With the aid of the aurora, we are now able to measure at least approximately how far the atmosphere extends above the surface of the earth, to analyze the composition of the rarefied air at heights too lofty to reach by any other means, and to understand better the invisible reflecting layers of the ionosphere which are so important in long-distance radio communication.

Analyzing the light of the aurora with the spectroscope is almost the only way of learning what kinds of gases are present in the ionosphere and how they are affected by the ultraviolet light and particles from the sun which produce the ionosphere's reflecting layers.

For all these reasons, scientists are more interested in the aurora today than ever before. It is fortunate and timely therefore that for the last eight years the National Geographic Society has made grants of funds for our study of the aurora at Cornell University.

This study, which is still continuing, has resulted in valuable additions to an understanding of the aurora's nature and behavior. Cooperating with us have been scientists of Colgate University and many professional and amateur observers in the United States and Canada. Prof. Carl Störmer of Oslo, Norway, who has studied the aurora for more than 30 years, also has been of great assistance.

Our work has been closely followed by the National Bureau of Standards, which issues regular forecasts of the state of the ionosphere

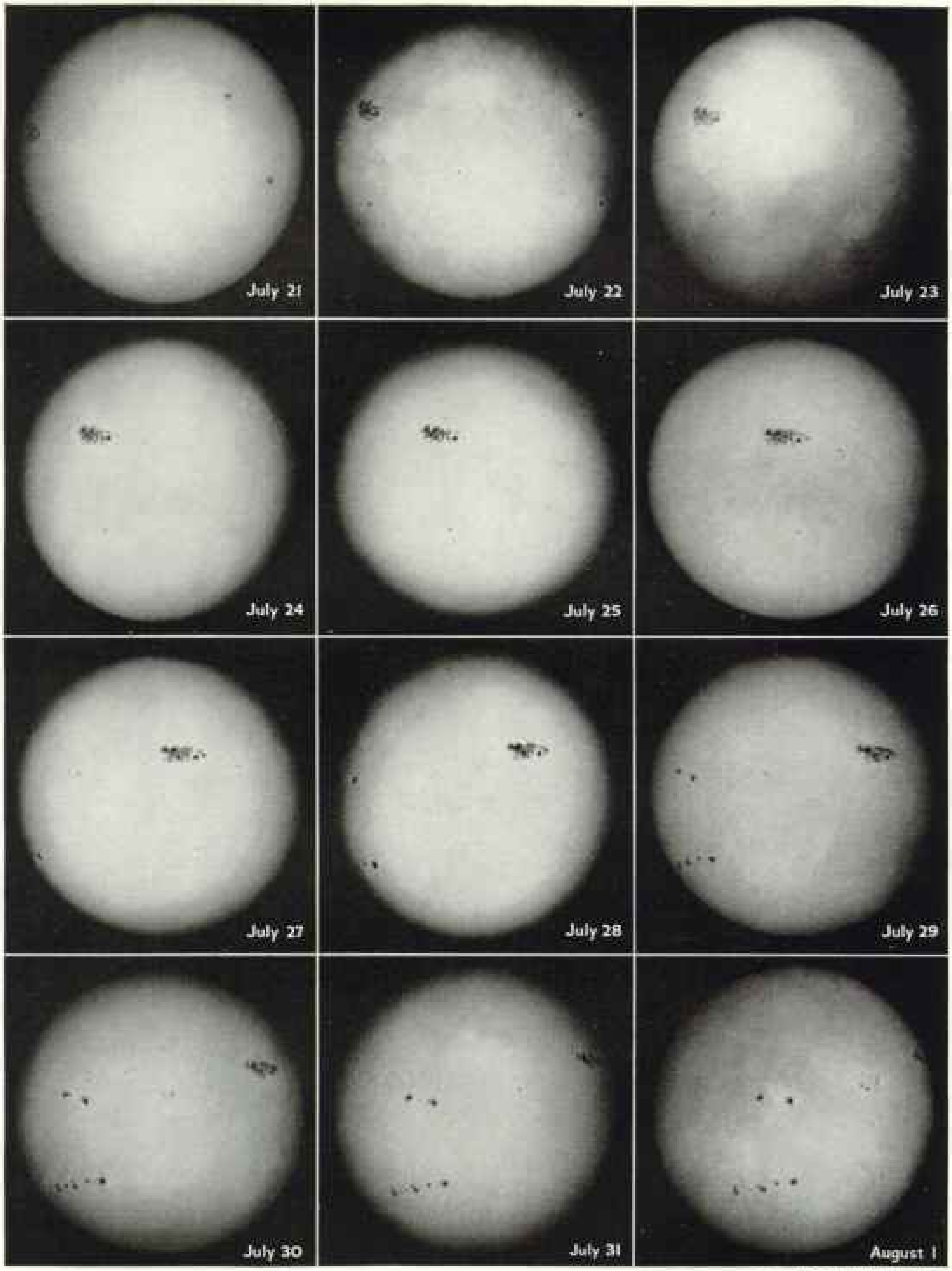
---

* See, in the NATIONAL GEOGRAPHIC MAGAZINE, "New Frontier in the Sky," by F. Barrows Colton, September, 1946.

© Wide World

North of the Arctic Circle, a Fur-clad Scientist Photographs the Aurora

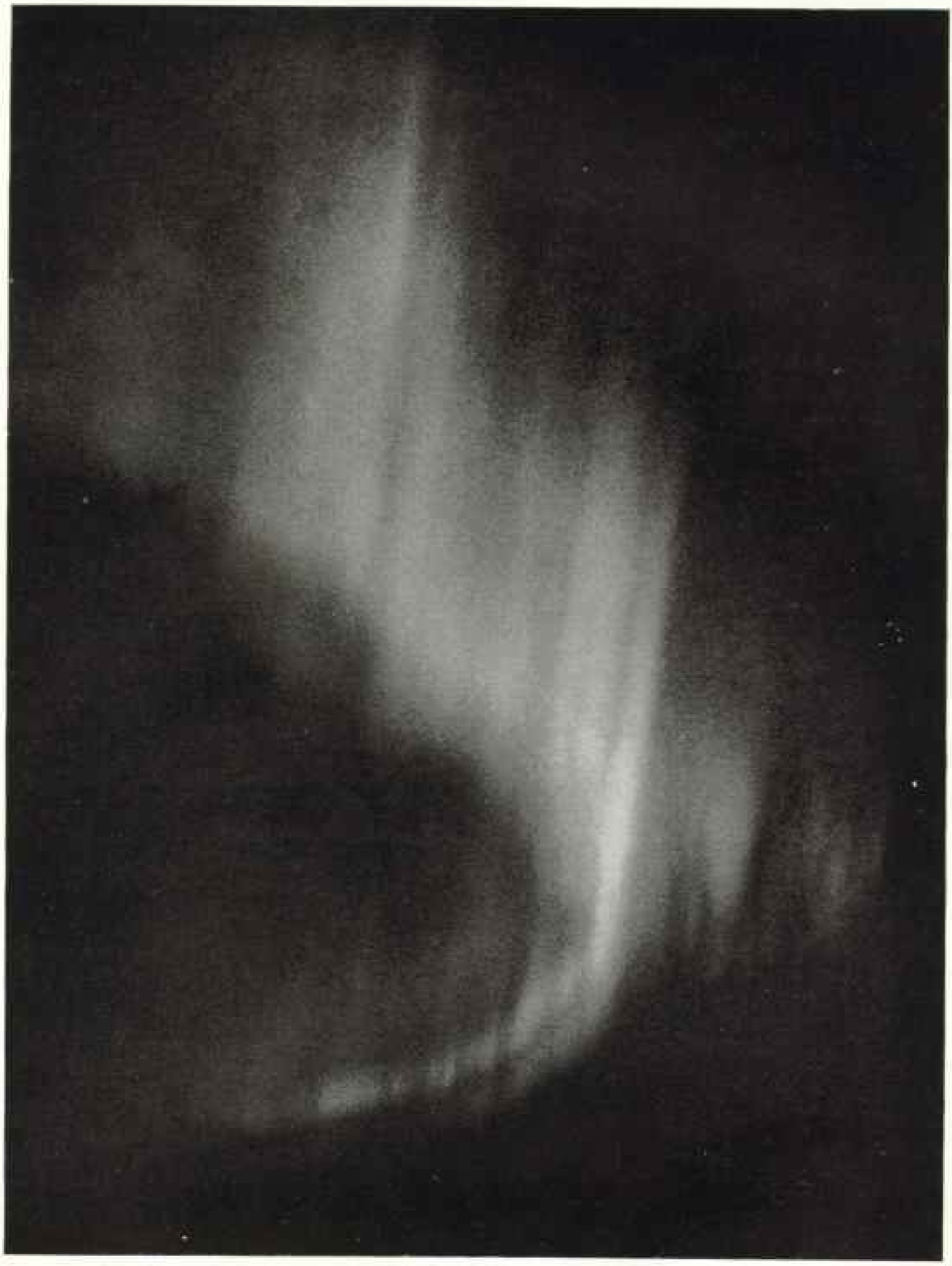
This picture was taken at the observatory at Tromsö, Norway, on the shore of the Norwegian Sea. In this latitude auroras are seen on an average of 240 days a year. Norwegian scientists, under the leadership of Professors Carl Störmer and L. Vegard, have contributed more than anyone else to knowledge of the aurora.


July 21
July 22
July 23
July 24
July 25
July 26
July 27
July 28
July 29
July 30
July 31
August 1

U. S. Naval Observatory

Great Auroras Were Seen on Earth as This Huge Group of Spots Moved Across the Sun

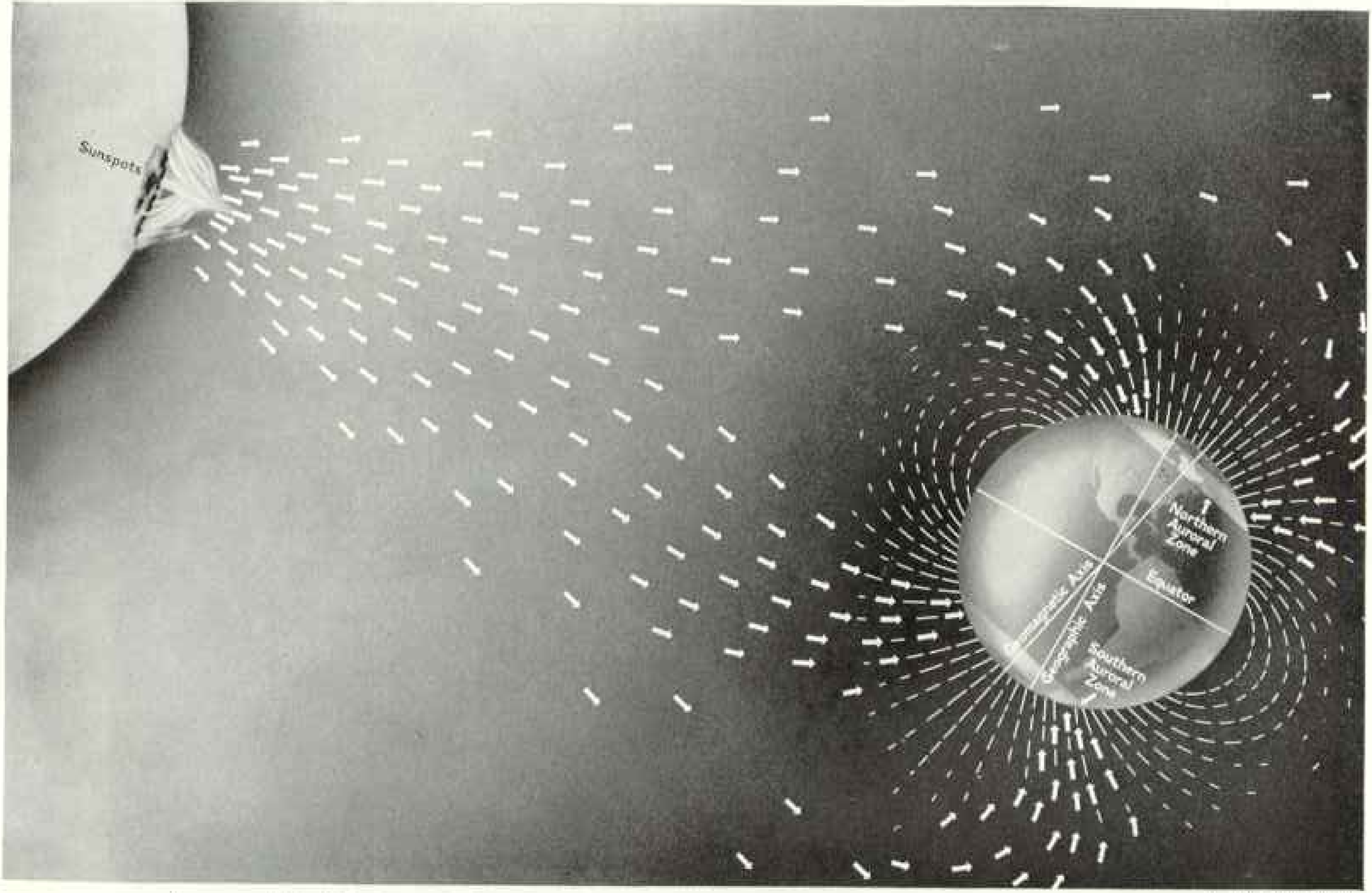
In this series, beginning at upper left, taken daily from July 21 to August 1, 1946, a group of spots can be seen moving across from left to right as the sun rotated. Streams of electrified particles, shooting forth from the vicinity of such sunspot groups, produce auroras on the earth (pages 673, 680).



C. W. Gartlein

Horseshoe-shaped Drapery Is One Form of Aurora Frequently Seen

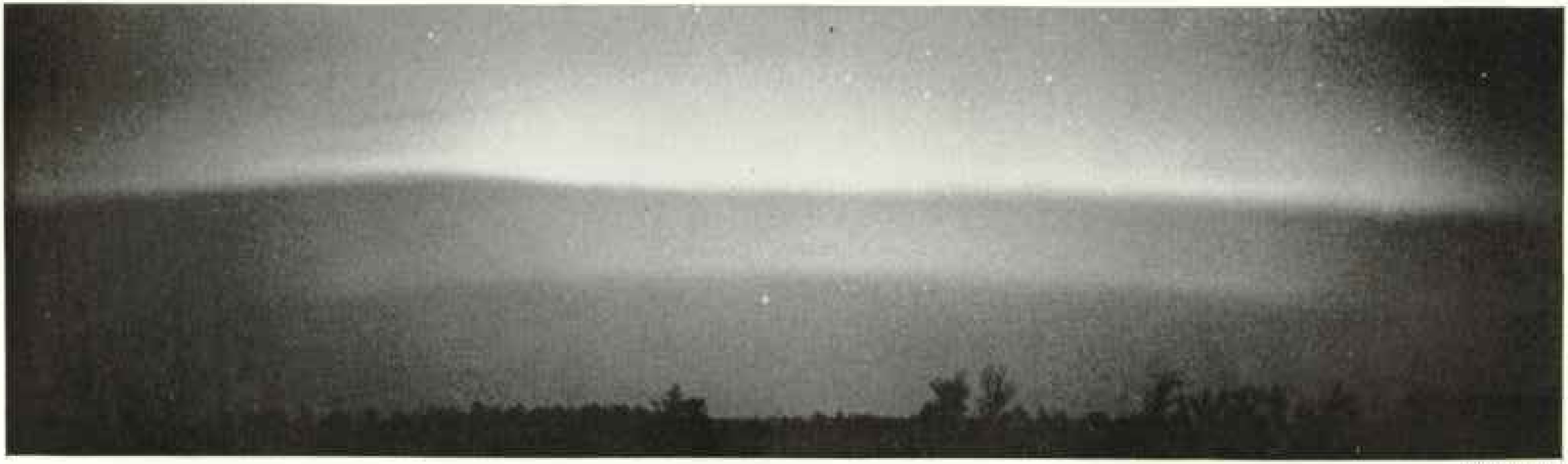
Draperies are created when bundles of rays lengthen out and form a band, which in turn assumes a curtain-like shape (Plate II). The lower border is often more luminous than the other parts. Draperies sometimes seem to move as if blown by a breeze (pages 697, 701, 703). A double drapery like this is rarely seen.


Sunspots
Northern Auroral Zone
Equator
Magnetic Axis
Geographic Axis
Southern Auroral Zone

Drawn by Irwin Alleman

Streams of Particles from the Sun, Entering the Earth's Atmosphere Around the Poles, Cause Auroras

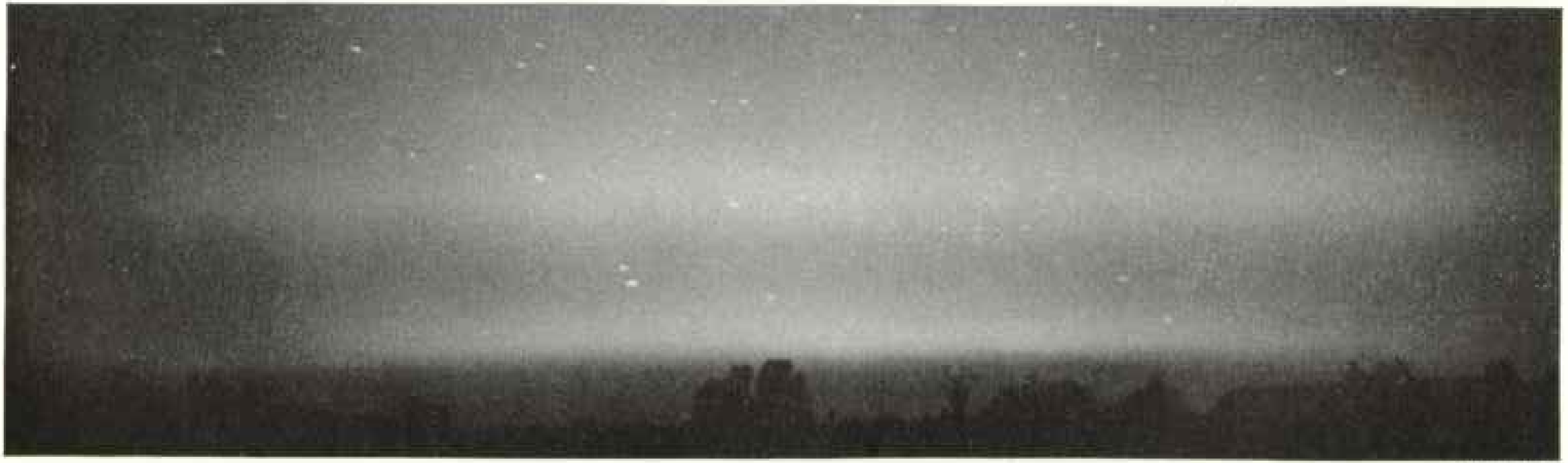
Arrows represent electrified particles shooting out from the sun from the vicinity of sunspots and giant flamelike "prominences" (page 683). Deflected by the magnetic field surrounding the earth, the particles come in around the polar regions and produce a glow in the upper air, which is what we see as the aurora (page 675).



C. W. Gartlein

This Aurora Display Presents a Homogeneous Arc Below and a Homogeneous Band Above

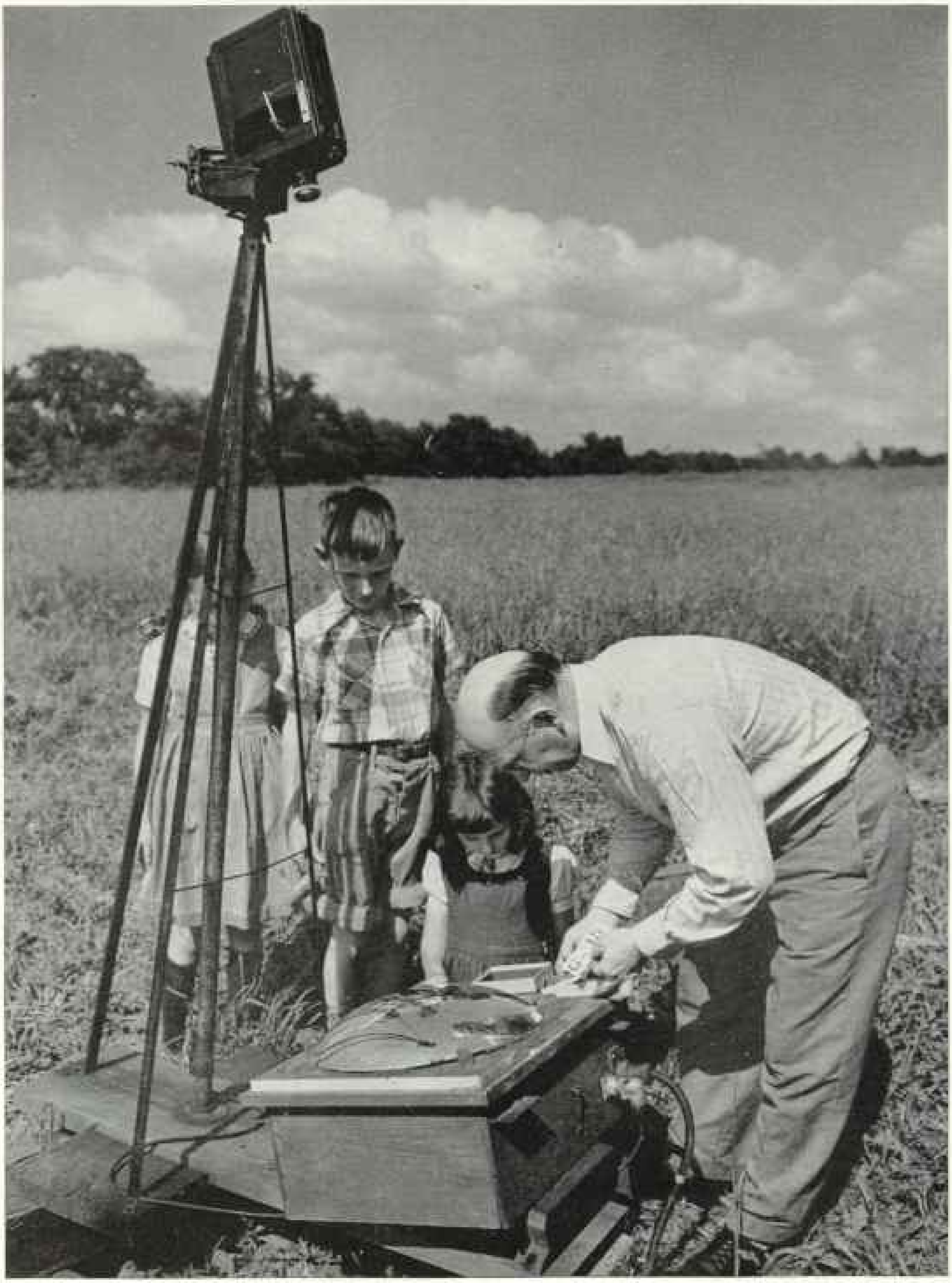
The band is more irregular than the arc. It is not unusual for two different types of auroras to appear together (pages 701, 702, 704).



C. W. Gartlein

Aurora with Two Homogeneous Arcs, One above the Other; Some Displays Have Several Such Arcs

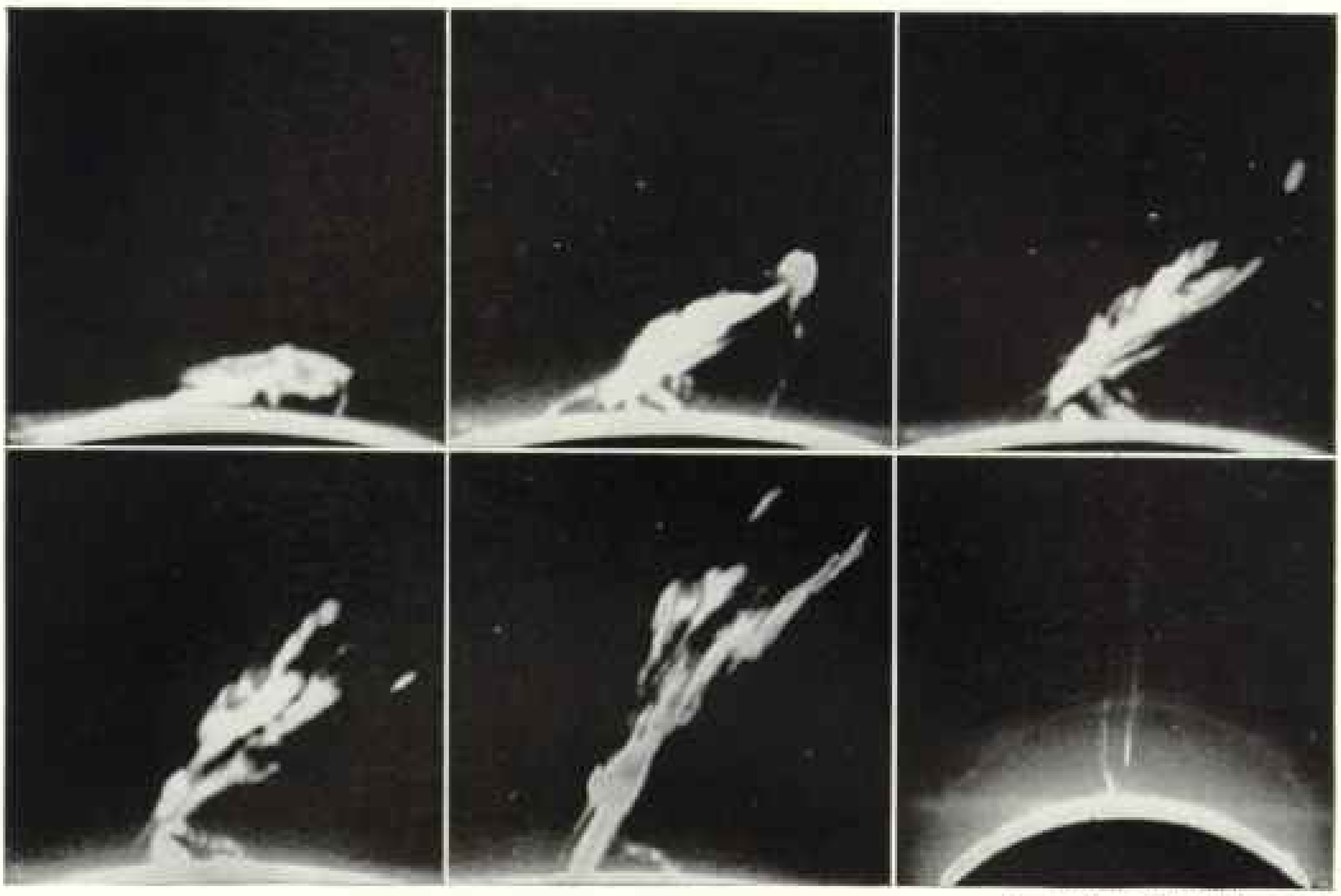
Often the arcs gradually climb up the sky and break up into rays, forming a rayed arc aurora (Plate III and page 703). This occurs after the lower border becomes sharp.



Staff Photographer B. Anthony Stewart

Auroras Covering Most of the Sky Are Photographed with the Aid of a Convex Mirror

The mirror, mounted on the box, reflects the entire sky, and the camera, aimed at the mirror, photographs the reflected image of the aurora. Thus an aurora of broad extent can be photographed in its entirety; otherwise part of it would be outside the camera field. The author changes a date label while his three children watch.



From McMath-Hulbert Observatory

When a Flaming "Prominence" Erupts on the Sun, Auroras on Earth Soon Follow

Streams of charged particles that cause auroras and their accompanying radio disturbances seem to come from the vicinity of great flare-ups of gas from the sun's surface near sunspots. These pictures, upper left to lower right, taken a few minutes apart, show development of a great prominence, September 17, 1937. Parts of the huge flame flashed upward at 420 miles per second. In the picture at lower right it extends 700,000 miles out from the sun.

and long-distance radio transmission conditions; also by the U. S. Coast and Geodetic Survey and the Department of Terrestrial Magnetism of the Carnegie Institution of Washington, both of which carry on research on the earth's magnetism (page 674).

Long-distance radio communication was all-important to the Allies in World War II because of the far-flung global operations of their armies and fleets. For this reason, every effort was made to forecast times of bad radio transmission, so that important military operations would not be scheduled during those periods.

The Aurora and Magnetic Storms

In view of this, it was fortunate that by the time the war came we already had enough data to show the close relation of the aurora to magnetic storms, and our data were of assistance in forecasting the storms and the resulting times of poor radio reception.

These forecasts, made by the National Bureau of Standards, were correct 70 percent of the time and are being continued because of their value in peacetime radio communication.

Our studies also have shown definitely that there is a close connection between magnetic storms, the aurora, and sunspots.

Sunspots are gigantic whirlpools or cyclones in the molten or gaseous surface of the sun (page 678). They increase and decrease in number through a regular cycle of approximately 11 years.

Accompanying the sunspots are "prominences," gigantic flamelike flare-ups of hot gases from the sun's surface (see above). Those showers of particles that produce the aurora and magnetic storms always come from the vicinity of sunspots and prominences.

There is reason to believe that the showers are shot forth from the prominences by the pressure of the sun's tremendous light.

Moving at 1,000 miles per second, the streams of particles take about 24 hours to travel from the sun to the earth. They probably are mostly electrons, with slow-moving positive ions included among them.

The stream starts out comparatively narrow, but widens greatly as it moves on. Such a stream completely envelops the earth in only a minute or two, but is so wide that the earth may be immersed in it for 24 hours.

Particles in the stream not diverted to the earth pass on beyond it, far out into space.

We can forecast the long-range occurrence of magnetic storms and auroras because they follow the sunspot cycle. When the sunspots grow few in number through their cycle of 11 years, the number of magnetic storms also drops off.

Scarcity of Sunspots Helped in War

This fact played an important part in the winning of World War II, for it was fought during a time of minimum sunspots. As a result, there were comparatively few magnetic storms to disrupt vital military radio communications.

It is easier to predict magnetic storms near the minimum stage of the sunspot cycle, because sunspots are then in low latitudes on the sun and therefore are aimed more directly at the earth. Streams from these spots also seem to continue longer, sometimes persisting for 5 to 12 months.

For a long time it was known that on days when there were magnetic storms there would be auroras at night. Our studies have shown that the intensity of auroras varies closely in step with the intensity of magnetic storms.

Though most of us who live in the Northern Hemisphere think of the aurora as the "northern lights," or aurora borealis (literally, "dawn of the north"), there is of course also an "aurora australis," or "southern lights," since the particles that produce the aurora come down into the atmosphere over the south polar regions as well as in the north. Collectively, the two are known as the "aurora polaris."

The aurora australis is seen far less frequently than the aurora borealis because there is hardly any inhabited land within the region where it is visible (Plates II, III, and page 695).

Contrary to common belief, the aurora is not most brilliant or frequent at the north and south geographic poles. At the North Pole it is only about as frequent as in southern Canada, and the region of greatest brilliance and frequency is somewhere between (map, page 676).

Centered Around Geomagnetic Poles

Auroras are seen within two oval-shaped zones centering around the geomagnetic poles. These poles are distinct from both the better known geographic and magnetic poles.

The geomagnetic poles represent the ends of the earth's geomagnetic axis, which is inclined at an angle of about 12° to the earth's geographic axis. This geomagnetic axis is the center of the magnetic field that extends out around the earth and diverts the particles coming in from the sun. The magnetic poles, however, are the places where the earth's magnetic field is perpendicular to the surface. They have no effect on the incoming particles from the sun.

The north geomagnetic pole is near Etah, Greenland, and the south is on the Antarctic Continent 1,100 miles west of Little America, about 78° south latitude, 111° east longitude.

In the north, the line of greatest frequency of the aurora runs through northern Norway, across central Hudson Bay, around to Point Barrow, Alaska, and through northern Siberia (page 676). North and south of this line the aurora is less frequently seen.

One may see 243 auroras in a year over central Hudson Bay and 100 over James Bay, but only 25 in Maine and only one in Florida. Southern auroras occasionally have been seen as far north as Samoa.

Best Places and Months for Auroras

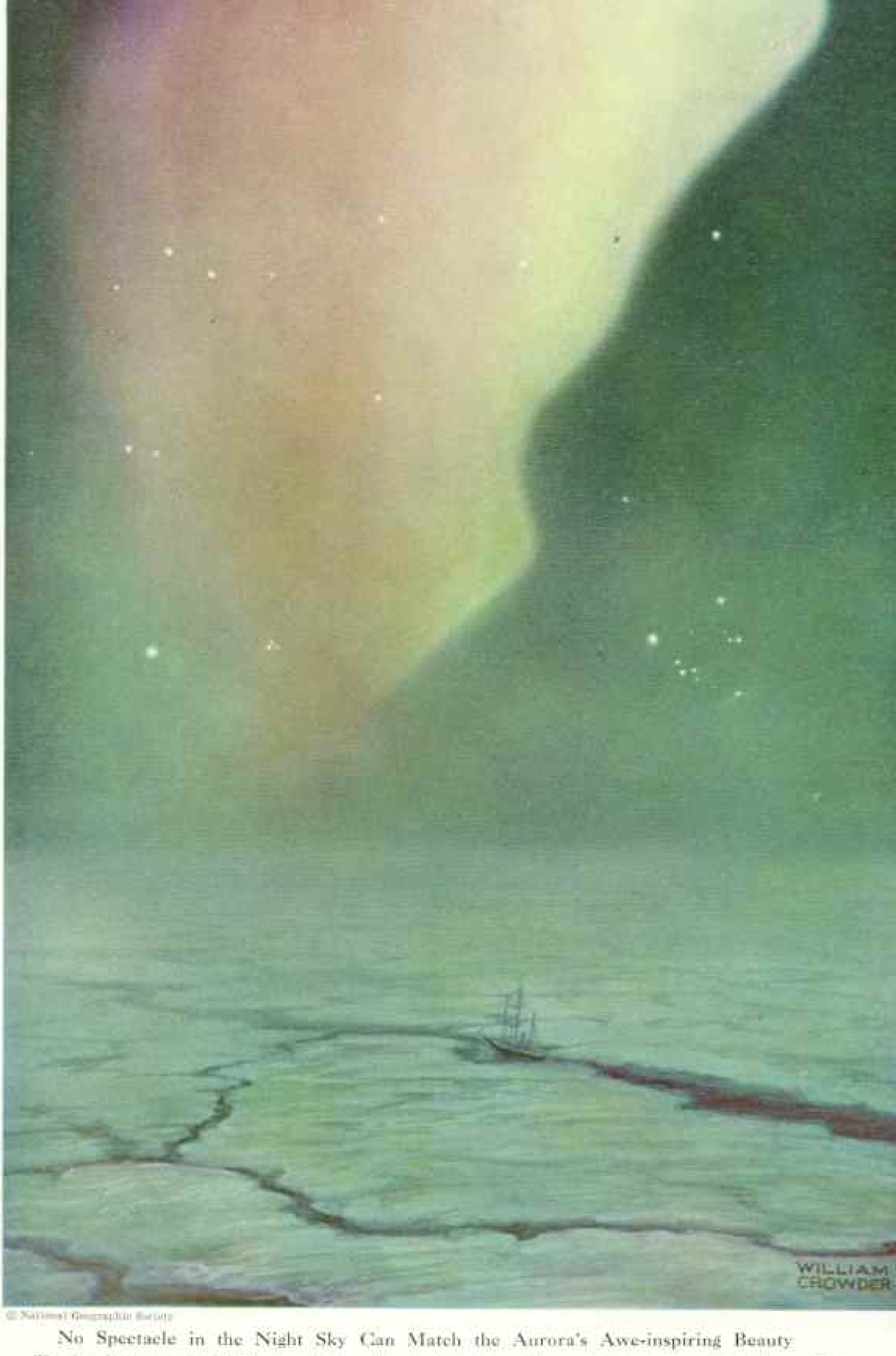
For people in the United States, the best places to see the aurora are located north of a line running approximately from New York City through Pittsburgh, Des Moines, and Boise, Idaho, to Salem, Oregon. Auroras are seen only occasionally south of this line. Two hundred miles north of it many more brilliant displays will be visible.

People living in the country or small towns are likely to see many more auroras than those in cities, where the lights interfere and tall buildings obstruct the northern horizon. The aurora is most often seen in the north in this hemisphere, but at times it may extend over the whole sky.

If you see an aurora whose base is one-fifth of the way up the sky (18°), it is over a point about 200 miles away. Halfway up the sky (45°), it is only 60 miles distant.

I have calculated that an aurora 60 miles high, showing 5° above the horizon, is about 430 miles north of Ithaca, which places it halfway from there to Hudson Bay. One aurora seen from near Fort Worth, Texas, September 27, 1938, was located over southern Minnesota and rose well beyond 210 miles.

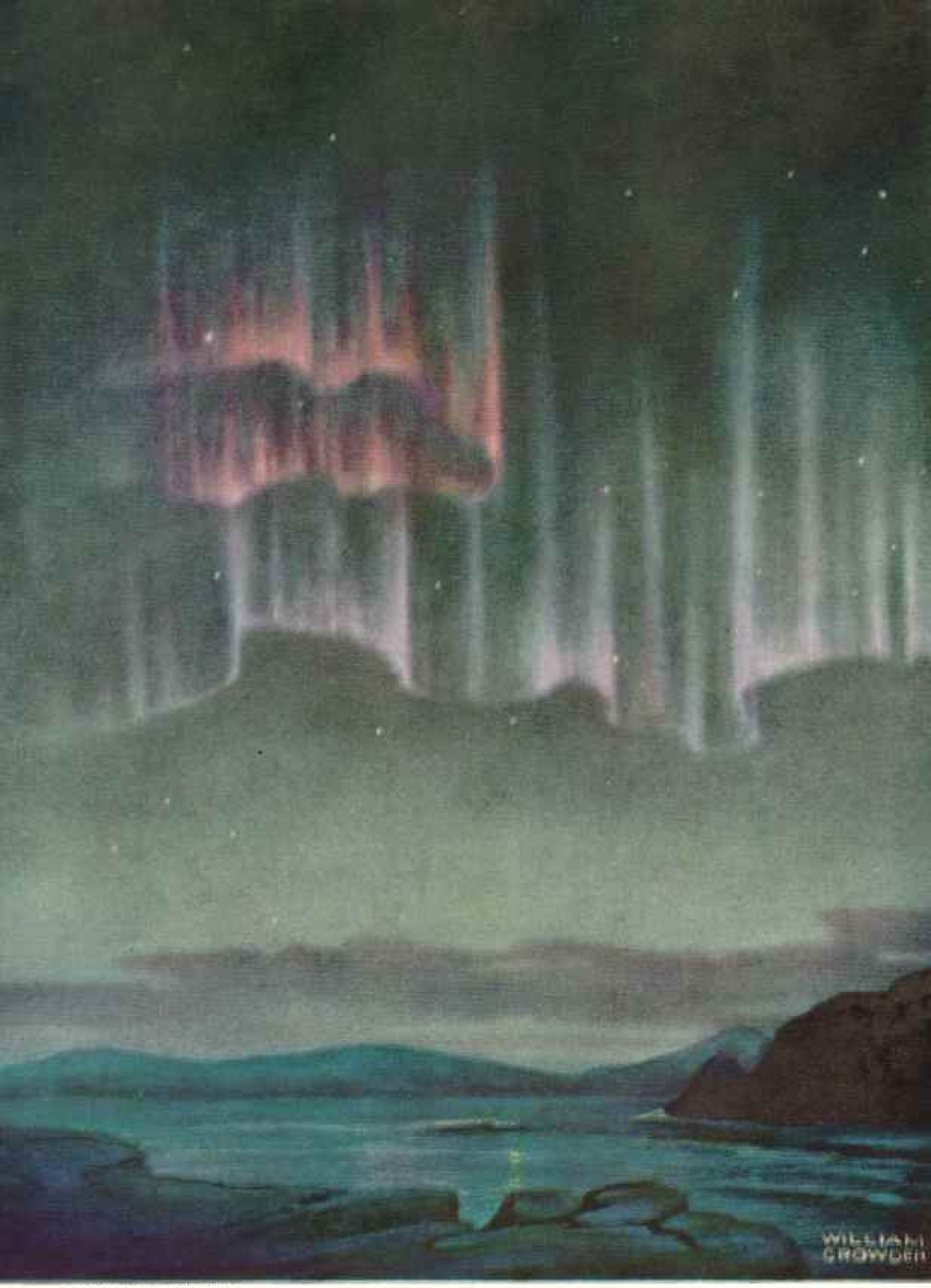
Auroras are most frequent during the months of the spring and autumn equinoxes—that is, in March and September—because at those times the earth is most nearly in a direct line with the areas on the sun where there are spots. This makes it more likely that the streams of particles from the sun will strike the earth and produce auroras. For the same reason, magnetic storms are most frequent at these times of the year.



© National Geographic Society

No Spectacle in the Night Sky Can Match the Aurora's Awe-inspiring Beauty

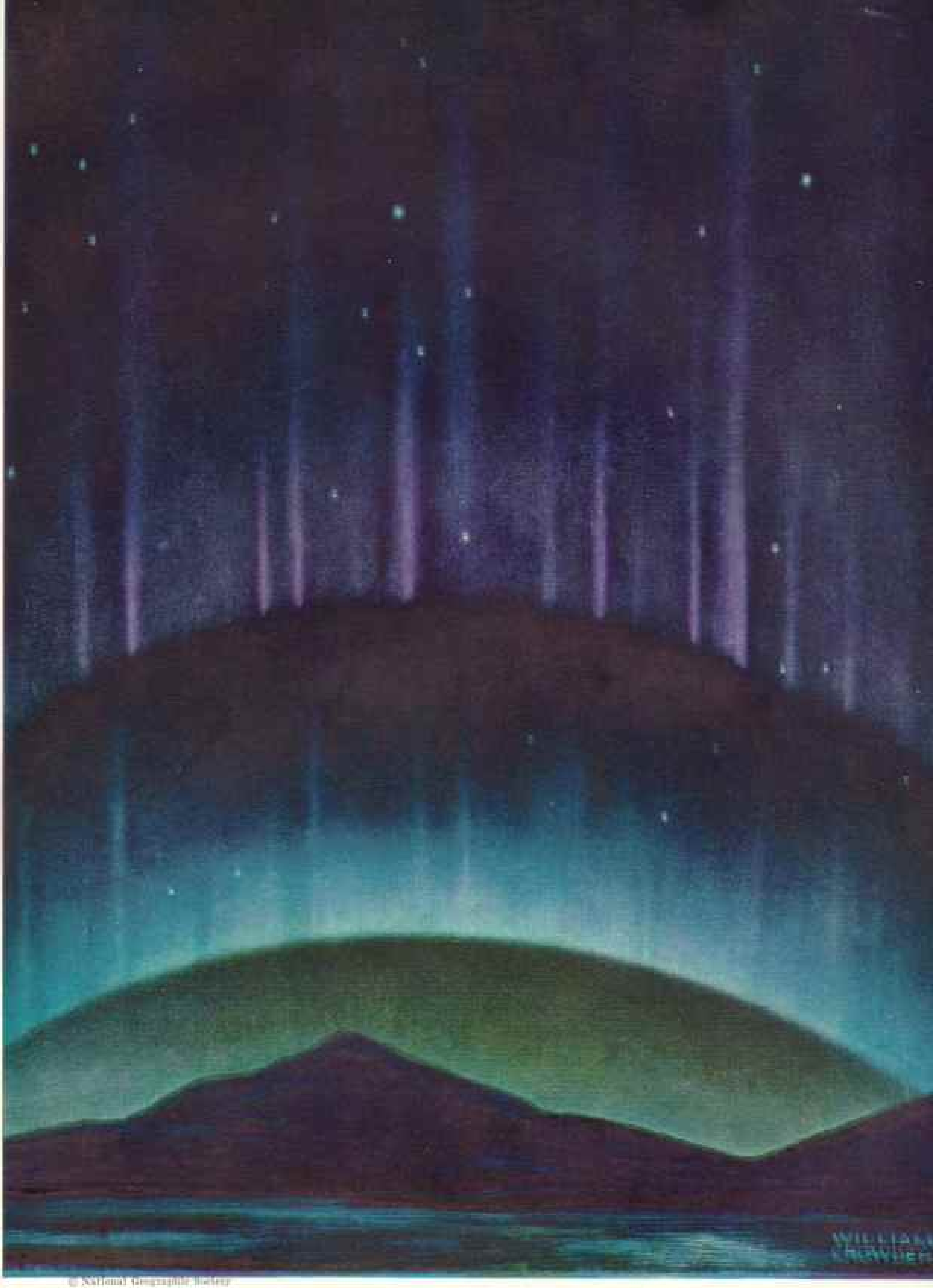
This is a Homogeneous Band, one of 12 recognized aurora forms, observed over ice floes off Norway. Constellation Taurus is at right. These paintings depict auroras in both Northern and Southern Hemispheres. When lighted by a single 25-watt lamp 35 feet behind the viewer, the plates will have the color and brightness of the aurora.



© National Geographic Society

Draperies Are Formed by Aurora Australis Near Wilkes Land, Antarctica

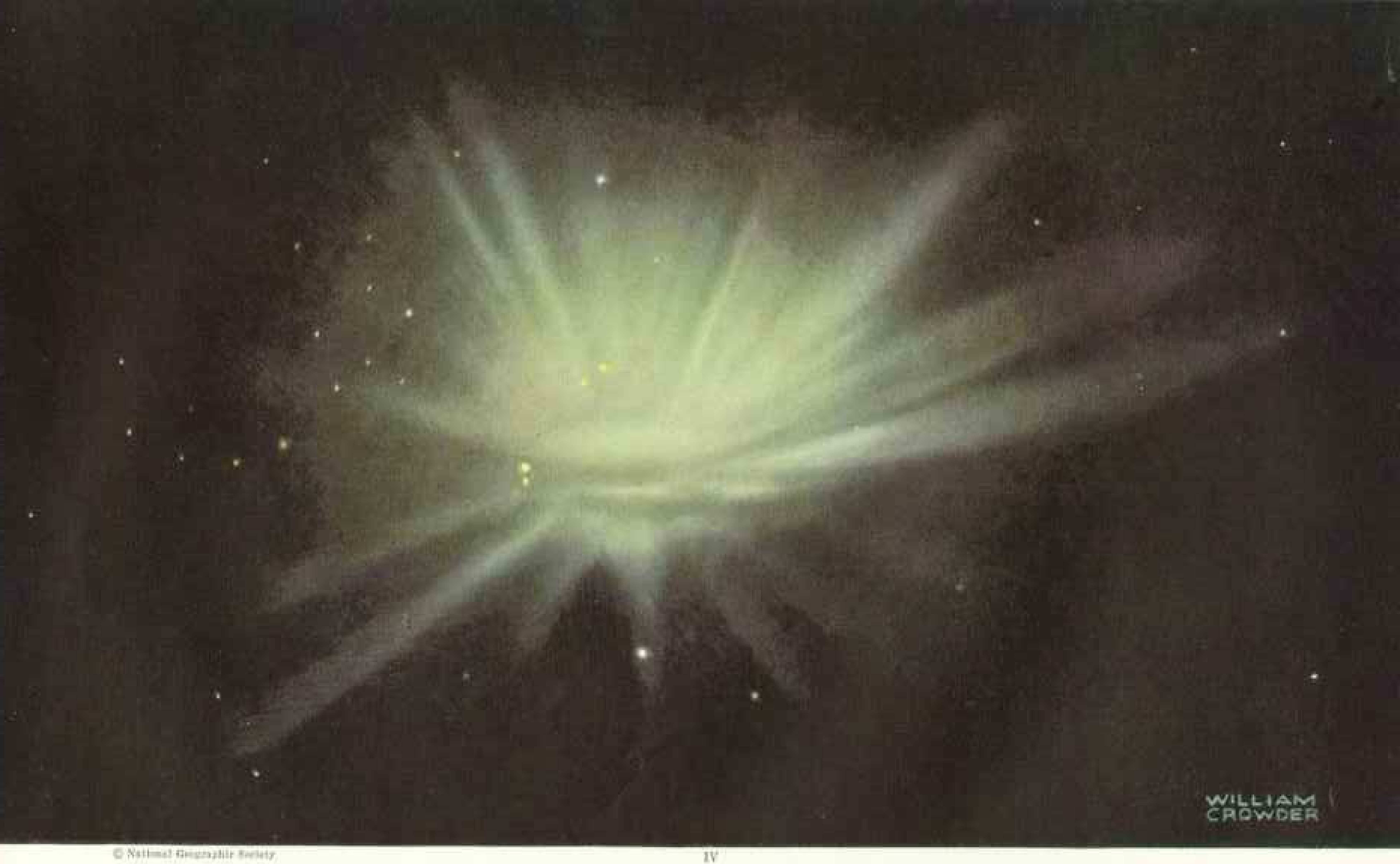
Northern auroras are painted from photographs, southern ones from sketches and descriptions.



© National Geographic Society

Two Rayed Arcs Form Another Antarctic Aurora, with the Southern Cross Above It

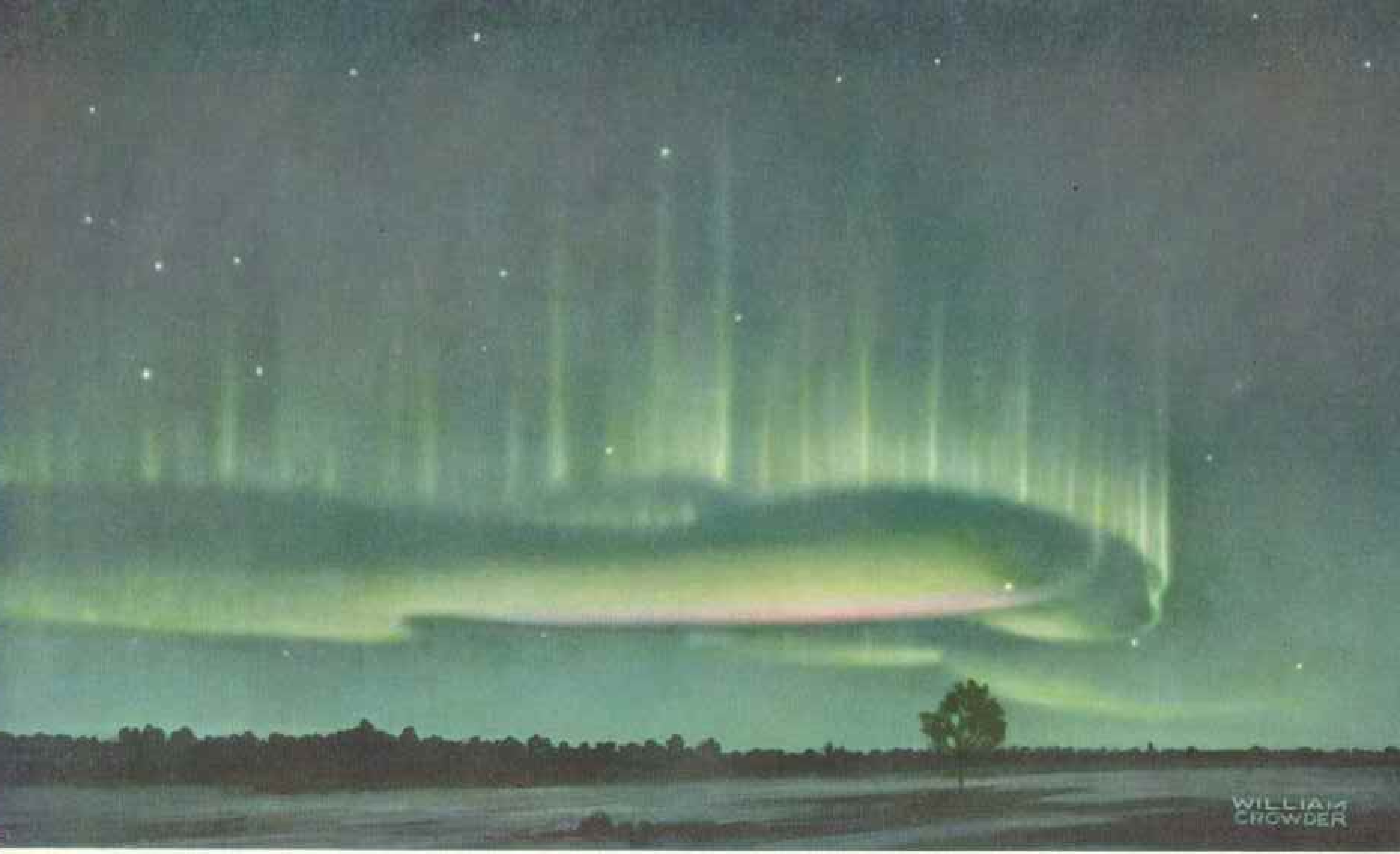
This display also was near Wilkes Land. The constellation, famous in the southern skies, is at upper center.


WILLIAM CROWDER

© National Geographic Society

IV

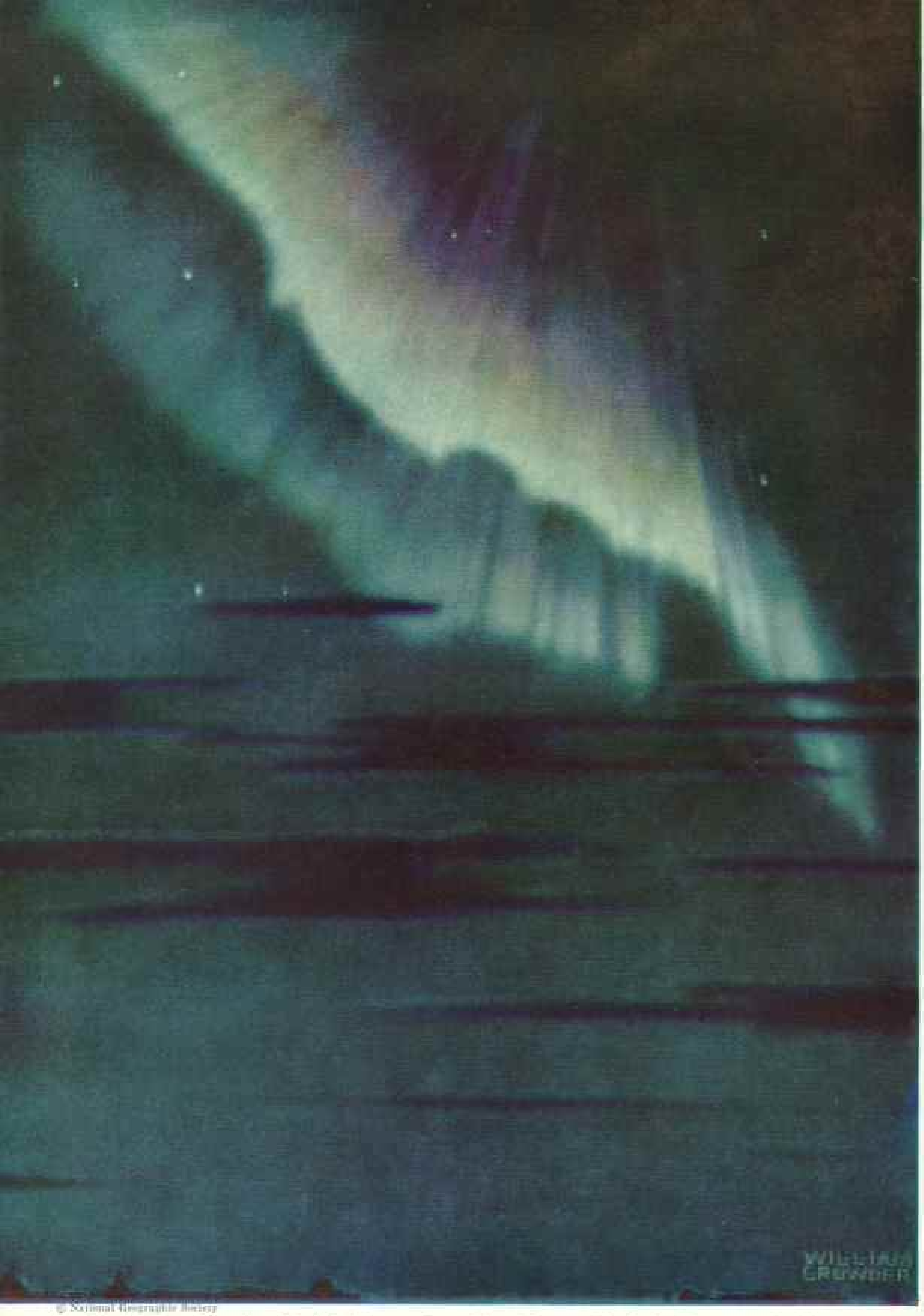
Corona Is Formed when Rays Seem to Converge Overhead, an Effect of Perspective: Observed at Ithaca, New York


WILLIAM CROWDER

© National Geographic Society

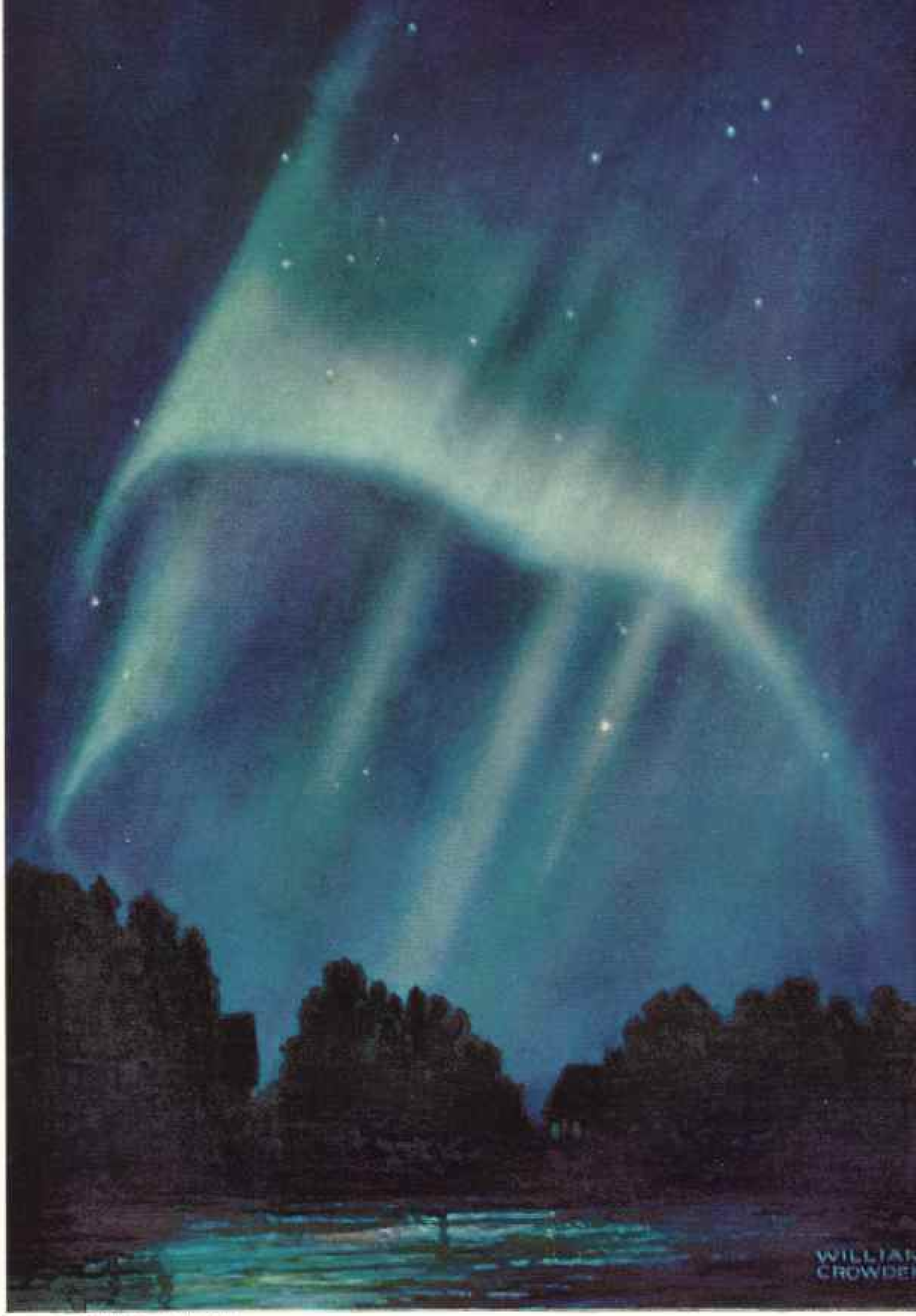
V

Rayed Band Above and Homogeneous Band Below. Upper Part May Have Rippling Motion: Seen at Hamilton, New York


WILLIAM CROWDER

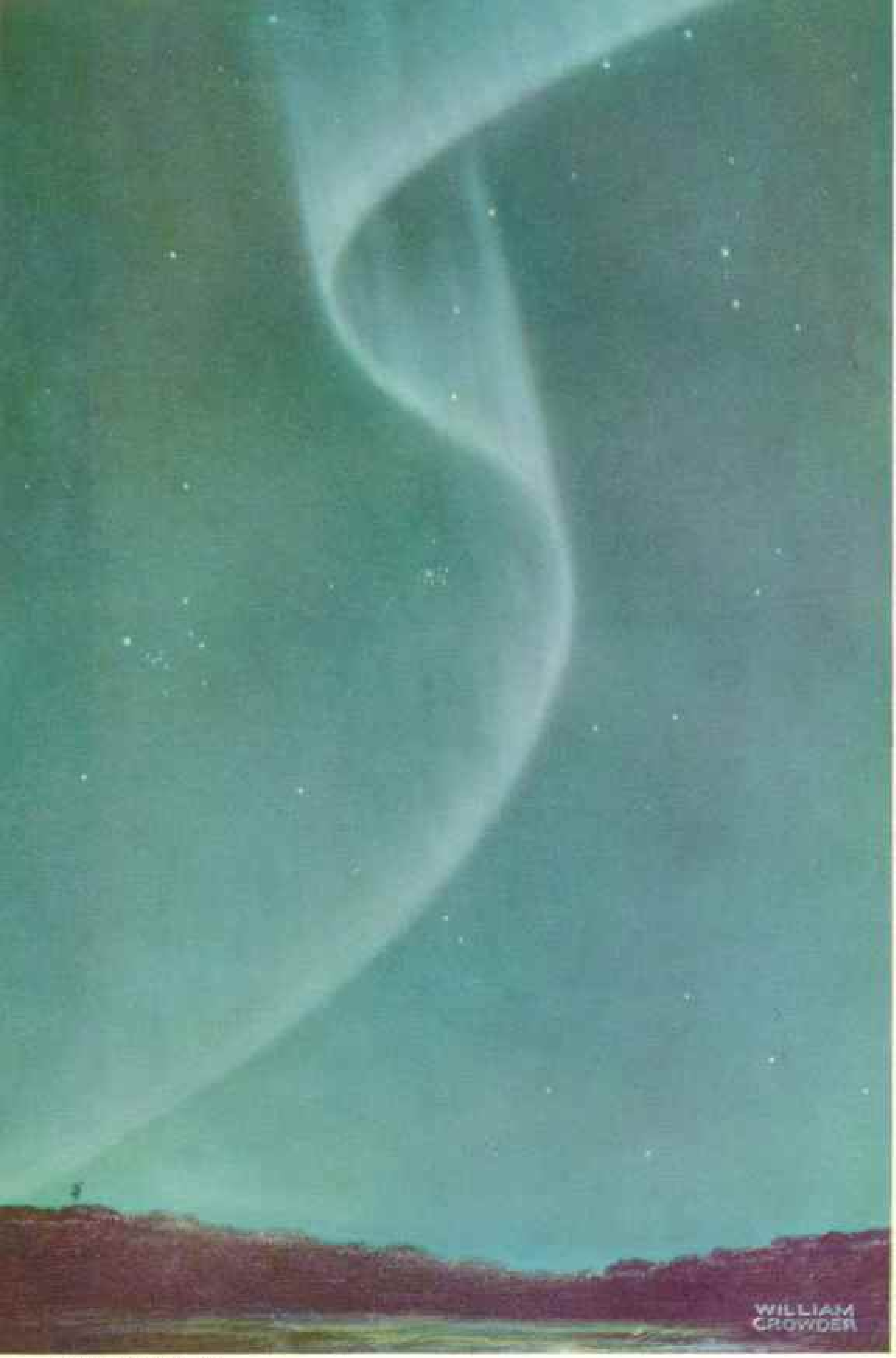
© National Geographic Society

Double Drapery Forming Partial Corona Resembles Fans. Clouds in Foreground—Norway


WILLIA
CROWDE

© National Geographic Society

Masses of Rays Are Formed when Rayed Band Breaks Up—Norway


WILLIAM
CROWDER

© National Geographic Society

Serpentine Rayed Band Has Snakelike Motion. Constellation Pleiades in Center—Norway

Auroras have been known to extend all the way across North America from east to west. Within the United States the arcs and bands of auroras lie east and west, with the western edge northward of the eastern edge. They usually appear to be part of a spiral formation which always disappears into the distance because it is too large to be seen as a whole from any one place.

Often before dark we know that we can expect an aurora because the British Broadcasting Corporation's short-wave radio programs are fading badly or are garbled. This is a sign that another stream of particles from the sun is pouring down on the earth and causing a magnetic storm.

City dwellers who seldom see an aurora and do not want to miss an opportunity would do well to watch the northern sky on those nights when short-wave radio reception is poor and when the radio network announcers say, "Because of circumstances beyond our control, we are unable to bring in our scheduled broadcast."

Anyone interested in photographing the aurora should remember that ordinary exposure meters are hopelessly inadequate in determining exposure times, since even a bright aurora is only 1/500 as bright as a bright sunset. Exposures for bright auroras with an f.2 lens on film of Weston speed 100 may be as short as one second, while faint auroras require 45 seconds to two minutes. Color film exposure must be 30 seconds or more.

Bible, Roman Chronicles, Associated Press—All Describe Auroras

Some of the earliest records of what almost certainly was the aurora come from warm climates where the aurora is a rare sight. Seneca, in his *Naturales Quaestiones*, says: "The fiery recess of the sky is like to a cave dug out of space."

The Books of Maccabees, parts of which are included in some versions of the Bible, describe what is believed to have been an aurora:

"And it came to pass that through the whole city of Jerusalem for the space of forty days there were seen horsemen running in the air, in gilded raiment, and armed with spears, like bands of soldiers.

"And horses set in order by ranks, running one against another, with the shakings of shields, and a multitude of men in helmets, with drawn swords, and casting of darts, and glittering of golden armour, and of harnesses of all sorts."

Often the aurora is mistaken for a great fire burning in the distance.

An old account from Roman times says that "under Tiberius Caesar the cohorts ran together in aid of the colony of Ostia as if it were in flames."

An Associated Press dispatch from London describing a brilliant auroral display in England and Europe January 25, 1938, said:

"The ruddy glow led many to think half the city was ablaze. The Windsor fire department was called out in the belief that Windsor Castle was afire. . . . The glow, bathing snow-clad mountaintops in Austria and Switzerland, was a beautiful sight, but firemen turned out to chase nonexistent fires."

In 1941, just before Pearl Harbor, some people in Washington, D. C., seeing an auroral display, which is rare so far south, thought it was a new weapon being tried out by the Army or searchlights helping to repel a surprise attack by the German Air Force.

The aurora is described in Norwegian chronicles of the 13th century. Norsemen believed that its lights were the Valkyries riding their ghostly horses through the sky.

The similarity between these ancient and modern descriptions of the aurora shows that it has not changed in form and appearance in at least 2,000 years.

Continuous records of the aurora were kept in New York State from 1825 to about 1863. They show that 25 to 100 auroras were seen each year during that period. Between 1938 and 1942 there were 10 to 40 bright auroras per year seen in the State, and as many more faint ones.

Some Eskimo tribes of Alaska believe the aurora to be the spirits of the dead playing a game resembling soccer, using a walrus skull for a ball. Eskimos of Hudson Strait think the aurora's lights are torches held by spirits searching for those who have died recently. The Copper Eskimos of Coronation Gulf consider it to be spirits that bring good weather. Eskimos of Point Barrow, Alaska, fear the aurora and always carry a knife when they go outside while it is shining.

"Noises" of the Northern Lights

Some observers in the Far North have reported that the aurora makes strange swishing, crackling noises. Some of these, undoubtedly, are produced by the freezing of the observer's breath as the exhaled moisture crystallizes in the extreme cold. Sometimes, too, the sounds really are the swishing of the wind among dry particles of snow or the creaking of ice floes.

A significant side light on the question of aurora noises comes from John A. Easley, Jr., who spent two winters (1943-45) at River Clyde, Baffin Island, operating an ionosphere observatory during World War II. He learned enough of the Eskimo tongue to talk with some of the natives. I quote a letter from him:

"One evening . . . during my second winter several Eskimos came into the house and remarked that the aurora was very bright. 'Aksaneealo! Eee-e, kowmayoalo! Peeooyoalo!' they said. (Lots of aurora! Yes, very bright, very nice!)

"Then one of them remarked suddenly, 'Neepeealo!' (very noisy), and the others grinned and agreed enthusiastically. I grabbed my parka and dived for the door. This was what I wanted to observe, a noisy aurora. But when I got outside and stopped to listen, I could not hear a sound.

"The natives came pouring out of the house, laughing at my queer behavior, and I questioned them immediately about the meaning of their statement 'Neepeealo.'

" 'What noise did you hear?' I asked.

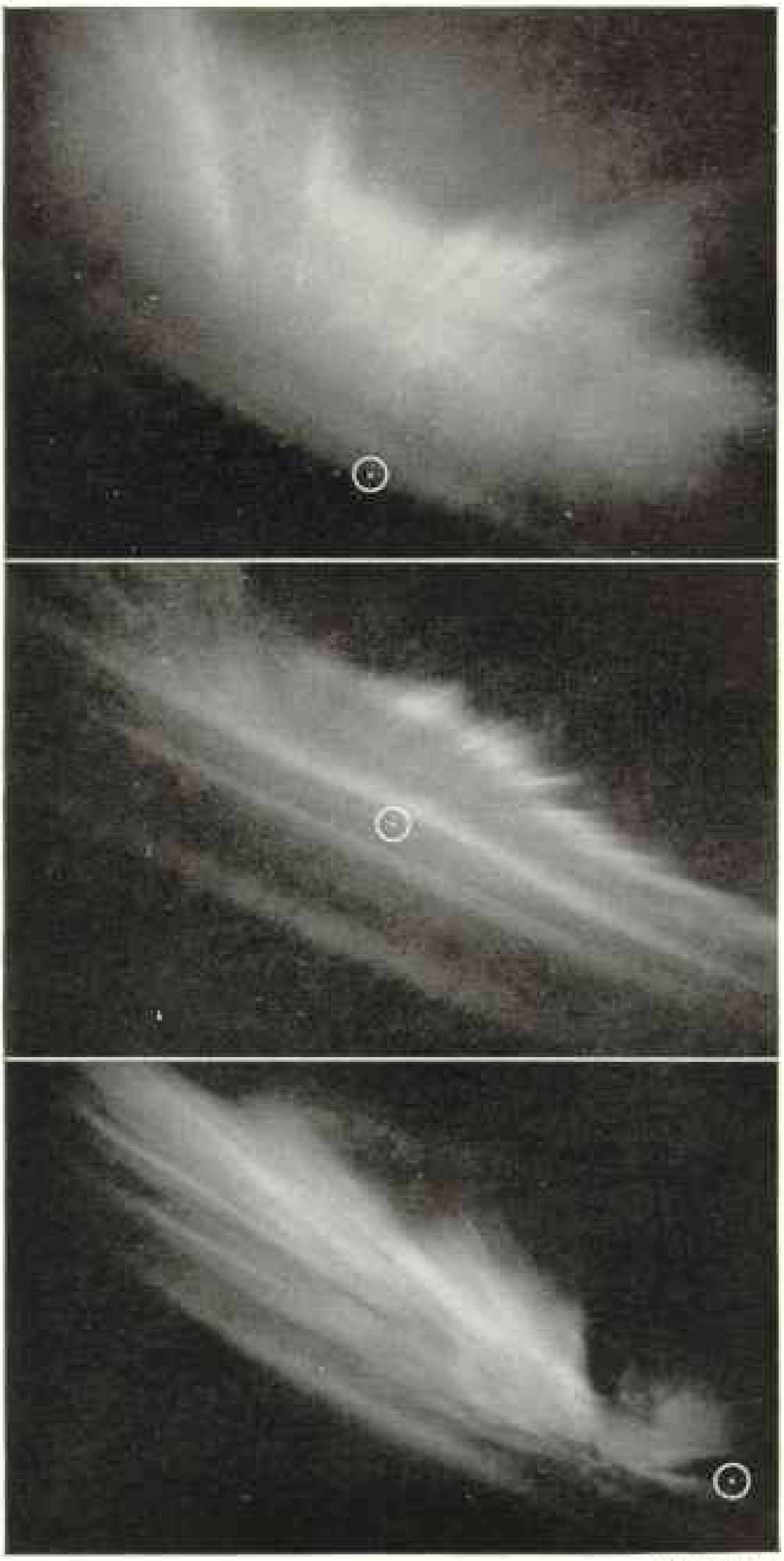
" 'Oh,' they said, 'there's no noise. The Eskimos say it's noisy when the aurora moves rapidly ('Aksanil audlatidloalo'). They say that there must be noise up there, because it moves like a cloth in the wind!'

" 'Oh,' I said, 'some people say they hear the aurora.'

"They laughed again, this time with that attitude, so characteristic of them, that the white man never will learn much about the north."

Perhaps this indicates that some previous reports of noise associated with the aurora may have resulted from a misunderstanding of what Eskimos meant.

It is hard to conceive of sounds coming from the heights where the aurora occurs, because sound does not travel in a vacuum and the atmosphere at those heights is so rarefied that it is essentially a vacuum. Very recent measurements made on V-2 rocket flights indicate



C. W. Gartlein

How an Aurora Can Change in Three Minutes

This corona form was photographed by the author three times (top to bottom) between 1:50:18 a. m. and 1:52:47 a. m., April 23, 1939. Its rapid change in shape is typical of many auroral displays. Constellation Corona Borealis can be seen in each picture, with the bright star Gemma circled. The corona type of aurora is formed by rays approaching the magnetic zenith. Because of the effect of perspective, they seem to converge at a point. The corona, a rare form, may be produced by long or short rays, by bands, or by draperies. The corona is especially exciting when flames seem to sweep through it.

U. S. Department of the Interior

Antarctic Explorers Photograph the Aurora Australis to Measure Its Height

With frost on their beards in the 70-below-zero F. temperature, two members of the United States Antarctic Service Expedition of 1939-41 make observations at an advanced base. Man in center is photographing the aurora; the one at right is listening to radio instructions from the main camp at Little America where scientists made pictures of the same display simultaneously to determine its height (page 696).

that the atmospheric pressure at altitudes of 60 to 100 miles is only one-millionth of the pressure at the earth's surface. If sound could come from that altitude, it would take five minutes for the journey and so could not be heard pulsing in step with the flashing of the aurora. Thus any sounds heard must be produced near by, and could not come from the aurora.

During a great aurora on January 26, 1938, several of Professor Störmer's observers in Norway reported a noise that seemed to come from a certain direction. Photographs of the aurora taken that night showed that it was much above the usual height. The noise may have been caused by winds in the stratosphere, far below the aurora, produced by a rising of the atmosphere. It also has been suggested that electric discharges at stratosphere level may produce the sounds.

Does the aurora affect the weather? Not directly, but the streams of particles that cause it may do so indirectly.

As the particles fall toward the earth, they expand the upper atmosphere so that it rises higher. We know this from the variations in the height of the aurora itself and from radio measurements of the ionosphere. This expansion of the upper atmosphere may disturb the equilibrium of the lower atmosphere where weather occurs, setting in motion air masses such as those that move down out of the Arctic and cause storms over North America.

Observatory near Ithaca, New York

When my study of the aurora began, with the aid of National Geographic Society funds, we decided to place the principal observatory at my home several miles north of Ithaca, away from the city lights. There my wife and I could easily attend the instruments during the evening and night hours.

Milwaukee Astronomical Society

Amateur Astronomers of Milwaukee Cooperate in Nationwide Study of the Aurora

C. M. Prinslow, center, prepares to take photographs to be used in height measurements, while Edward Halbach (left), with telephone headset, talks to another observer making pictures simultaneously 35 miles away. William Albrecht (right) measures the aurora's brightness with a photometer. Many amateur observers have assisted the author's aurora research, and the help of many more is needed, both in the United States and in Canada (page 700).

People have asked why I observe the aurora from the vicinity of Ithaca, where displays are less frequent than farther north, and why I do not go to the high Arctic regions where traditionally the aurora is most brilliant.

In the far north, of course, the aurora cannot be seen at all for half the year because of the continuous daylight during the six months of Arctic day, whereas in lower latitudes, as at Ithaca, auroras may be seen all the year round. Four times we have seen one on the Fourth of July!

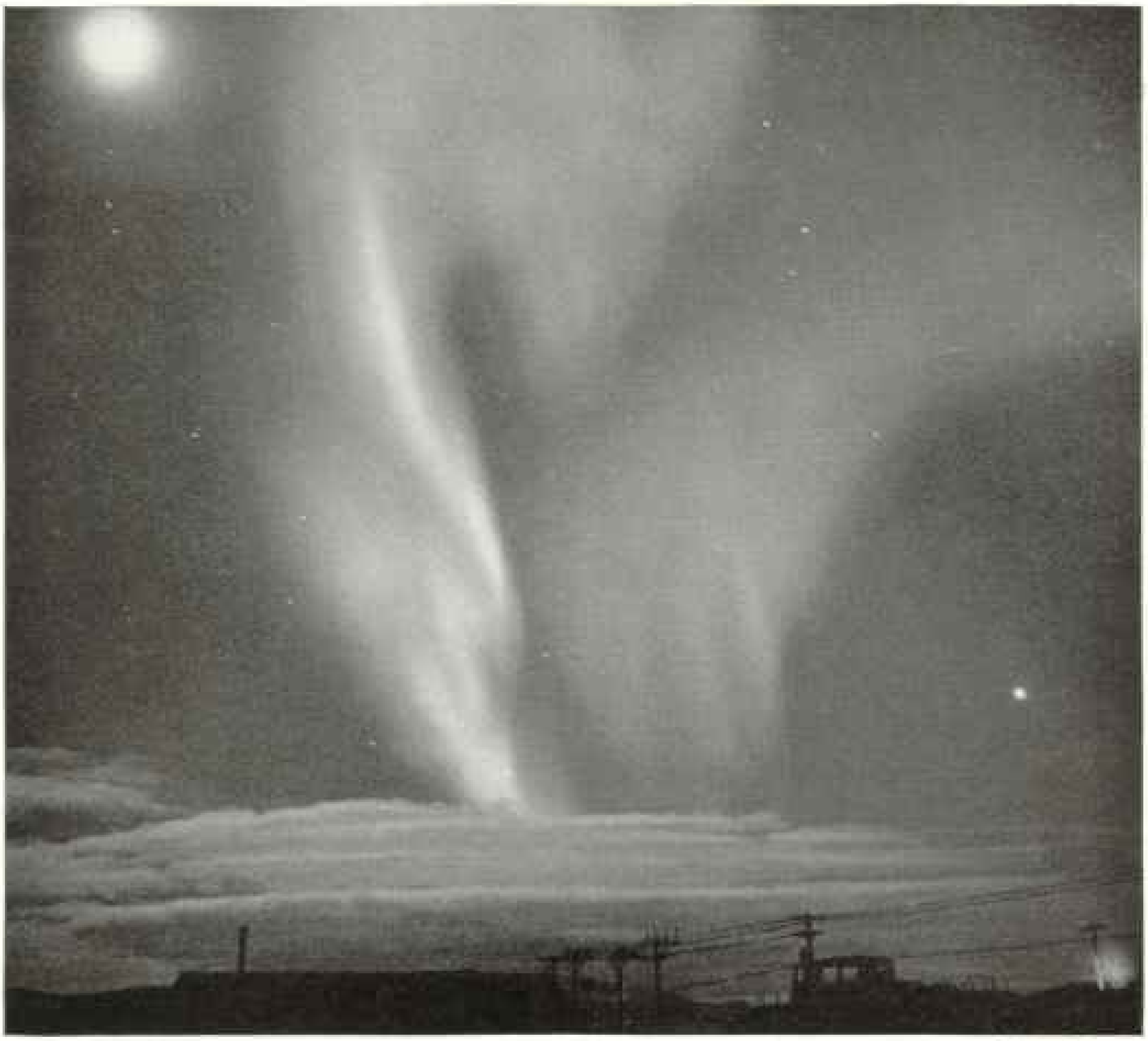
But the main reason for observing as far south as Ithaca is that the auroras visible here are the results of much larger disturbances on the sun than are many of the auroras farther north. These large auroras are easier to correlate with magnetic storms and radio disturbances, which form one of the main reasons for studying the aurora.

How High Is the Aurora?

Some people have reported seeing auroras touching the ground, but this is only an illusion. Light of the aurora can be reflected from fog, mist, smoke, buildings, the ground itself, or by mirages, so that it appears to be on the ground when actually it is many miles aloft.

No aurora has been measured at a height of less than 35 miles above the earth's surface.

We are especially interested in measuring the heights of auroral displays, to learn at what altitudes above the earth the incoming



Wallace J. Traplo

This Aurora Is in the Form of a Drapery Viewed Edgewise

It was photographed at Narsarssuak, Greenland, February 18, 1945. The white dot in the lower right corner is the planet Venus. The larger light at the extreme upper left is the moon, which, although actually only a crescent, appears full because of the length of exposure (pages 679, 701, 703).

particles from the sun begin to excite the atoms of the air. The highest aurora so far known was measured by Professor Störmer in Norway and extended more than 600 miles (1,000 kms.) above the earth.

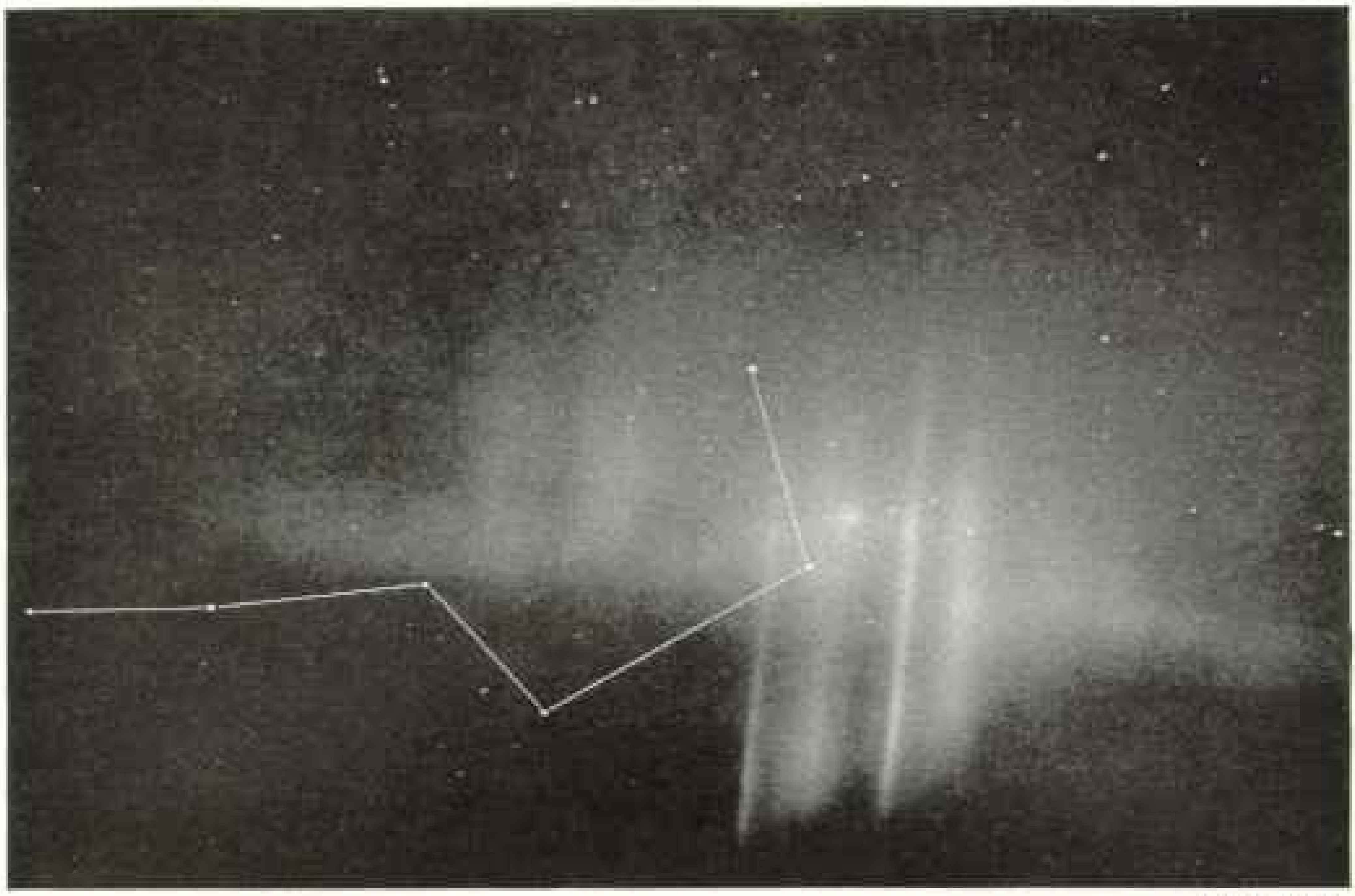
This indicates, incidentally, that the earth's atmosphere must extend up to at least that height, for there can be no aurora where there is no air to be excited by incoming particles from the sun. Probably in no other way could we determine how far upward the atmosphere extends and where, at least approximately, it merges into the emptiness of outer space.

Since we are 1,200 miles south of Professor Störmer's location, we undertook height measurements to see how aurora heights vary with geographic latitude.

We measure heights of auroras by taking photographs of the same display simultaneously from two points a number of miles apart. On the two pictures the same aurora will be in a slightly different position with respect to the stars in the background. Knowing how far apart the two photographs were taken, we can compute accurately the height of the aurora by measuring the difference in its position on the two photographs (pages 698, 699).

Long-distance Phone Links Scientists

Prof. C. L. Henshaw and I have been taking such photographs for several years at Cornell and Colgate Universities. My observatory is connected by telephone with the one high in the Memorial Chapel tower at Colgate, 53 miles away. On nights when a good aurora is on display, we use the telephone in arrang-



C. W. Gartlein

Aurora's Height Is Measured with Photographs Made from Two Points

This picture and that on the opposite page show the same aurora, photographed simultaneously from Ithaca, New York, and Colgate University, Hamilton, New York, 53 miles apart. Note that in this picture taken at Ithaca the aurora is farther to the right with respect to the stars of the Big Dipper, in the background, than in the photograph taken at Hamilton. By measuring this difference in position, it is possible to calculate the height of the display (page 696).

ing to take simultaneous photographs of it (page 703).

First, I measure the aurora's brightness with a photometer, or sensitive exposure meter, to determine the exposure time for the cameras, and we decide at what part of the aurora the two cameras are to be aimed. Then I ask, "Are you ready?" Professor Henshaw at his end replies, "Ready."

I say, "Open her up." He says "Open." I say "Close," and he responds "Closed." We have followed this ritual on countless nights, year after year. Occasionally one of us, happening to wake up and see a bright aurora in the middle of the night, has routed the other out to take advantage of the opportunity for a good photograph.

Our telephone line, kept open constantly during our long vigils, sometimes helps amuse us in unexpected ways. Once, in the spring, a flock of wild geese flew over my observatory, honking loudly and heading directly north toward an aurora we were watching. Henshaw heard them clearly over the telephone. Another time I heard in Ithaca the cheers at a football rally being held on the Colgate campus!

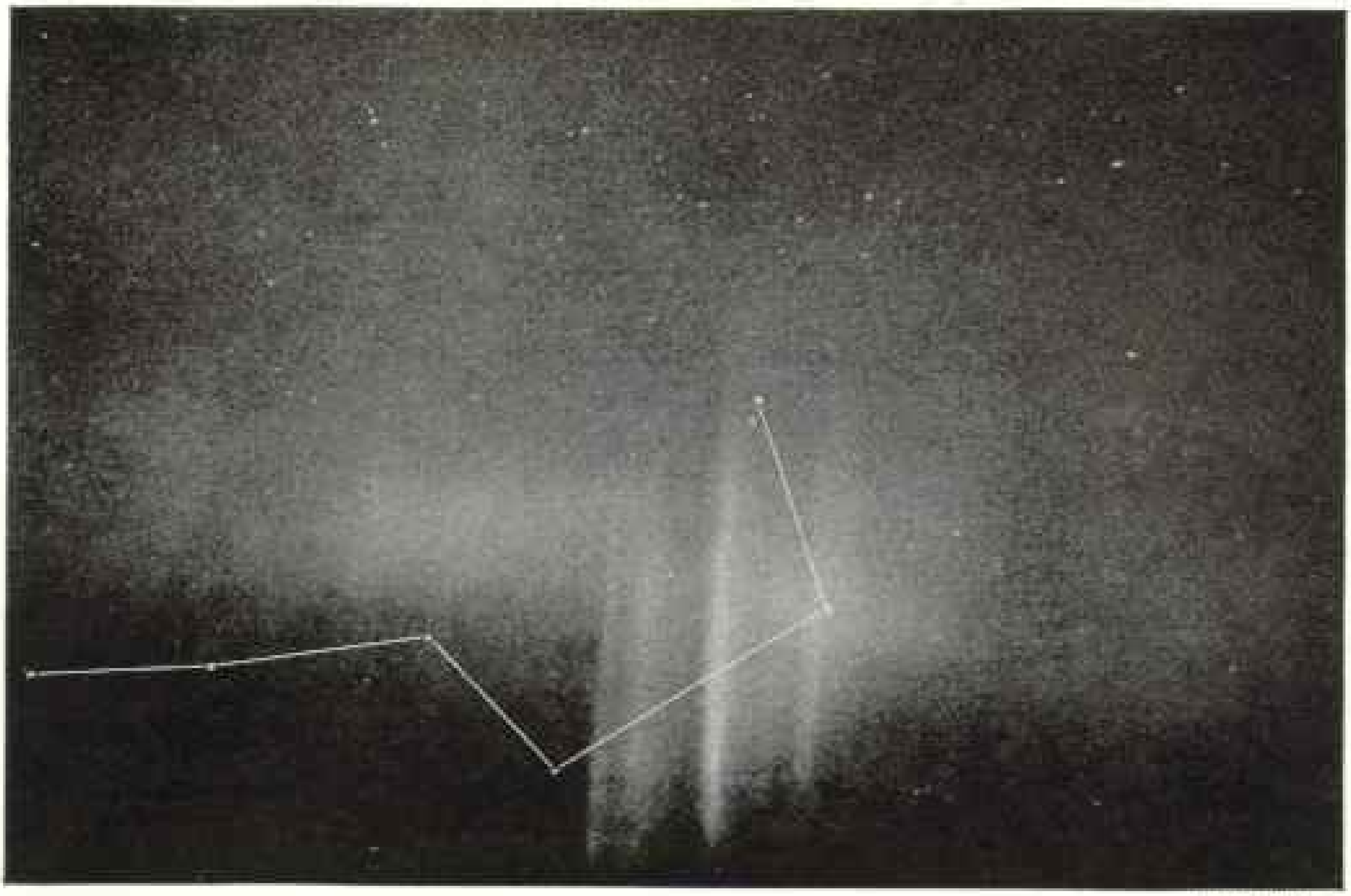
We now have more than 300 pairs of pictures on which we are measuring heights of auroras. It takes several hours of work to analyze each pair of pictures on which heights are measured.

To record the changing form and development of an aurora, we use an automatic-sequence camera which takes a picture every 30 seconds. It has made more than 10,000 pictures of auroras thus far.

My wife and I both lost many hours of sleep when we first started observing the aurora, but now our work is made less arduous by using mostly semiautomatic instruments which run all night and turn themselves off before dawn, recording what they "see" on photographic film and charts.

Measuring the Brightness of the Lights

To measure the varying brightness of auroras we use an automatic recorder equipped with a photoelectric cell. The sensitive cell reacts to the aurora's brightness and records it as a wavy line on a moving strip of paper. It cannot distinguish between the aurora and other lights, however, and twice it recorded the light of burning buildings two to five



C. L. Henshaw

This and Picture Opposite Were Taken Simultaneously, Though 53 Miles Apart

Through a long-distance telephone connection, the author checks with his colleague, Prof. C. L. Henshaw at Colgate University, so that both photograph an aurora at the same instant (page 697). They have taken more than 300 such pairs of pictures, on which the heights of the displays are being measured. Most auroras are about 100 miles high, though one is known to have extended 600 miles above the earth, thus indicating that the atmosphere reaches at least that height.

miles away! It even recorded the brilliant flash of the great meteor which appeared on May 4, 1945, over Philadelphia, about 190 miles from Ithaca.

A bright aurora lights up the landscape at night about half as much as the full moon.

Every so often an aurora will cover almost the whole sky, and it is difficult to photograph such a display with an ordinary camera. We have, therefore, experimented with an "all-sky camera," equipped with a convex mirror aimed upward, which photographs the entire sky on one picture (page 682).

We use one precision spectrograph, which records the spectra of bright auroras, and two patrol spectrographs which run automatically all night and have made 4,500 exposures so far. They record the presence or absence of auroras, their magnitudes and colors, and how the spectrum changes during a display.

These spectrographs serve to tell us what gases in the lofty upper atmosphere are excited into the auroral glow by the incoming showers of sun particles. The spectrographs break up the aurora's light into its different wave lengths.

The resulting spectrum lines tell us that most of the light of the aurora comes from oxygen and nitrogen, showing that the thin air at great altitudes is mostly composed of these two substances.

We have found no sign of the very light gas, hydrogen, a fact which upsets the old belief that the lightest-weight gases rose highest in the earth's atmosphere.

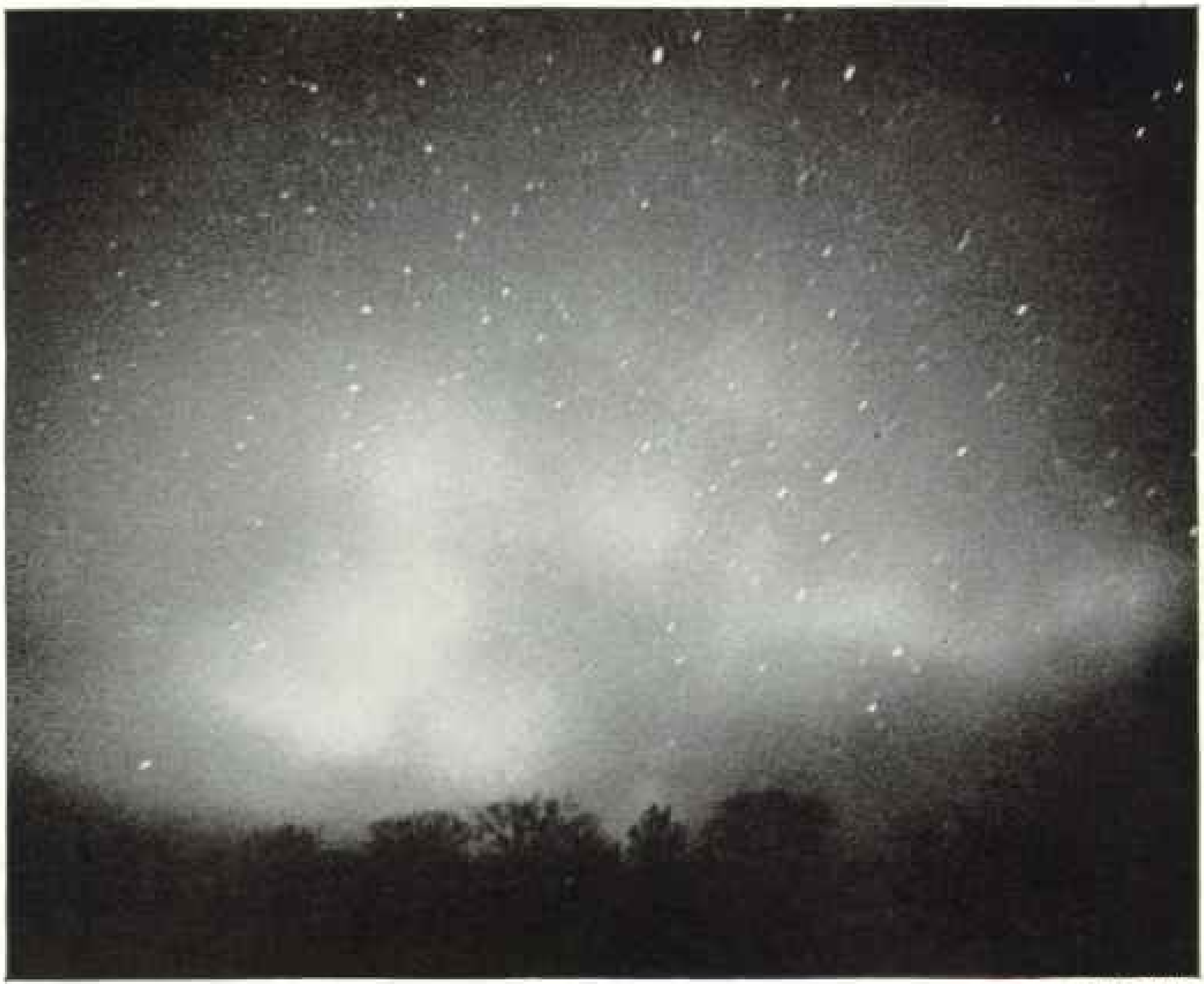
Colors of the aurora are produced by the excitation of atoms and molecules of oxygen and nitrogen.

Oxygen atoms produce the bright-red and yellow-green colors of the aurora. Nitrogen molecules give the orange-red, blue-green, blue-violet, and deep violet-gray shades. Different colors come from the same element when it is in different states of excitation.

When auroras are weak, they tend to look green because the human eye is much more sensitive to green than to red, for example, and green is the aurora's predominant color.

Two Important Findings

Our observations have provided the best data ever gathered in the United States on when auroras occur, their forms, when the forms change, their position in the sky, their



C. W. Gartlein

"Old Rays," Shown Here as Patches of Light, Often Signal an Aurora's End

As a display begins to fade, the rays often become short and fuzzy, forming parts of diffuse surfaces. After this stage of a display the aurora usually disappears unless a new arc begins to form (page 704).

brightness, and the sequence in which various forms and displays follow one another.

We have learned two important things. One is that auroras occur much more frequently than previously had been believed. Our own observation indicates that auroras are visible to the unaided eye at Ithaca about one night in ten. With a special optical filter which picks up the characteristic green light of the aurora and shuts out other colors and moonlight, we have detected many faint auroras on nights when otherwise moonlight would make them difficult to see.

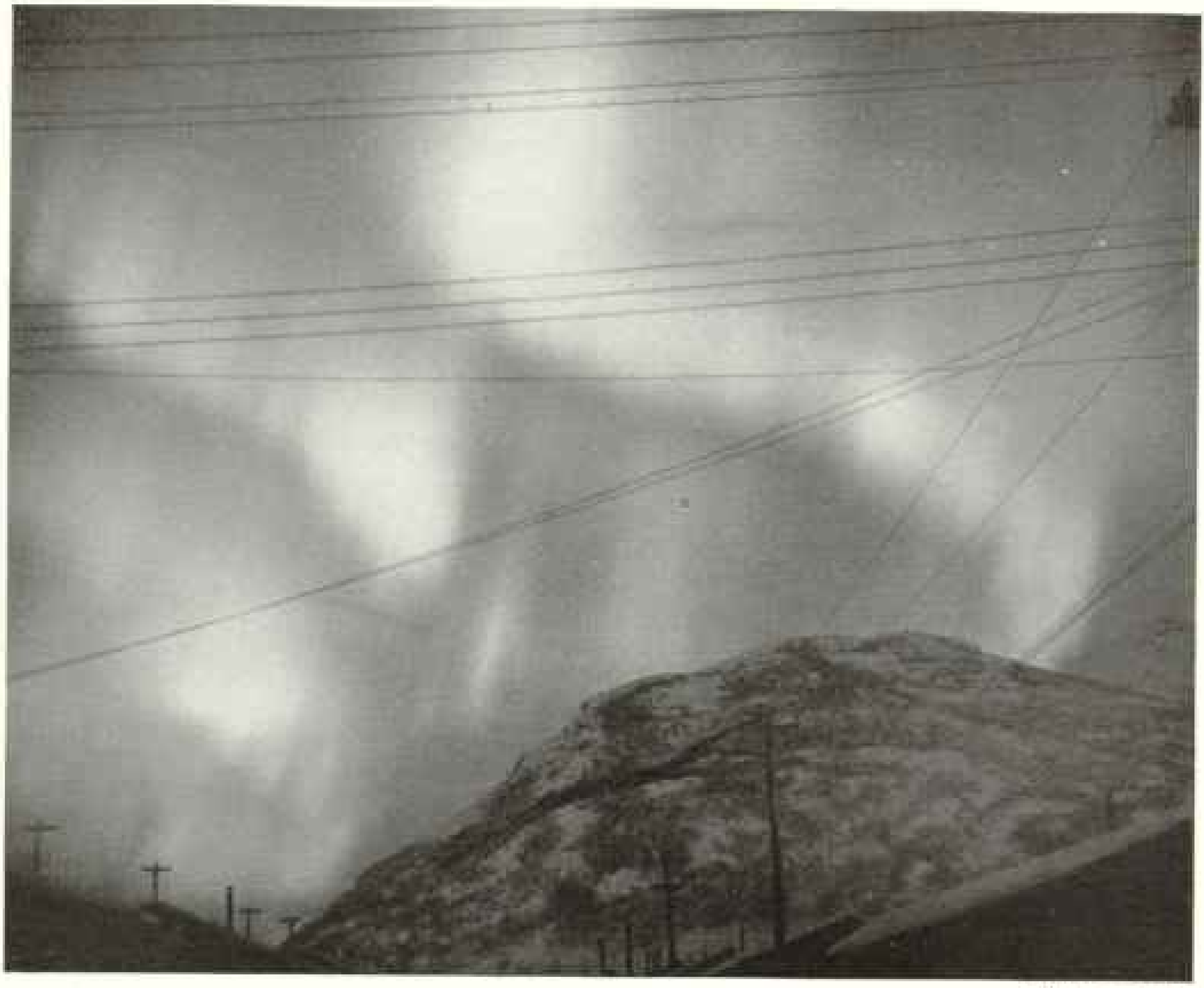
About a fifth of the light of the normal night sky is a kind of faint nonpolar aurora, apparently produced by particles from the sun that do not shoot out in the major streams.

Our other most important discovery is the close time correlation between auroras and magnetic storms, which confirms more strongly than ever before that auroras are caused by the same showers of particles from the sun that produce magnetic storms. We are looking for other detailed correlations in regard to form and changes in the aurora.

Our work at Cornell and Colgate has been assisted by many cooperating observers located at points all over the northern United States and in Canada. From them we have received from 20 to more than 50 reports on various individual auroras, which have been invaluable in checking our own observations and determining over how large an area various auroras could be seen (page 696).

There is no space here to mention these people individually, but our deep gratitude goes to all.

Many more observers are needed, and I should like to appeal especially for help from professional and amateur astronomers and members of the National Geographic Society all over the world who have some knowledge of astronomy and are willing to put in some serious work. Detailed instructions will be sent gladly to anyone who writes either to me or to the National Geographic Society.



Wallace J. Tragila

Three Draperies Appear Together in an Aurora Photographed at Narsarssuak, Greenland

Predominating colors were yellowish green, with faint traces of a bright cherry red. The red parts were constantly in motion and appeared like bands of gas being ignited, the photographer reported. The picture was made on January 18, 1945.

For those interested in the details of auroral displays the following outline is presented.

It should be remembered that displays almost always follow a certain sequence, but do not always begin at the same stage of the sequence. Twilight may fall with an aurora already in full blast, while on another night no aurora is seen until after midnight.

Three Main Forms of Auroral Displays

Auroras are grouped in three main classes—ray forms, homogeneous or nonray forms, and pulsating forms. The ray forms are the ray, rayed arc, rayed band, drapery, and corona. The nonray forms are glow, diffuse surface, homogeneous arc, and homogeneous band. The pulsating forms include arcs, pulsating surfaces, and flames.

These forms have a tendency to appear in rather definite sequences. The smallest aurora consists only of a glow, a diffuse veil of light extending upward from the northern horizon and fading out gradually above. Often an arc, part of a circle, rises from the north. It is usually sharply bounded below and thus has a definite northern boundary. The usual height of these is 55 to 65 miles above the earth.

Presently the glow fades, the arc brightens and may break into isolated parts or into diffuse, cloudlike surfaces which fade away into a glow that gradually disappears.

When the lower arc border is bright, the arc usually changes to a rayed arc, a smooth curve with "searchlight" beams diverging from the top. The arc may become wavy and serpentine and is then a band which breaks into a rayed band. The ray parts may form curtains which move as if blown by a breeze.

These larger displays become very complicated, with horseshoe-shaped bands and draperies (page 679). As they move south of the zenith, the converging rays form a corona. This convergence is a perspective effect, since all the rays are actually parallel.

C. W. Gartlein

Pulsating Arc Auroras Flash Up and Disappear with a Regular Rhythm

They pulsate with a period of one to 30 seconds. The color is usually bluish green. Short white lines are trails of light made by stars during the long exposure of the photograph.

Measurements show that ray forms are higher than arcs. They run from 75 to 100 miles in height and sometimes to 600 miles when the upper atmosphere is sunlit. The corona center is not quite overhead, but about a fifth of the way down the southern sky from the true zenith. The arcs lie along the geomagnetic latitude parallels and have their highest point on the geomagnetic meridian.

The pulsating forms appear near the peak of the display and may take the form of an arc which emits other faint arcs that travel upward rapidly. The most exciting form is the flame, where waves of light pass up ray forms to give the appearance of flames. The pulsating surface seems to be a brightening and fading diffuse surface.

As the display fades, all forms become more faint and diffuse. Sometimes the arc reforms, and the complicated display begins over. It apparently cannot do this without the arc's reforming.

Of course the combinations are varied and striking. Five arcs have been seen at one time at Ithaca. Unusual forms are the high arc, 120 miles high instead of 60, which is widely separated from other auroras. Regularly spaced rays are very rare, as are certain types of pulsating forms.

Twelve Forms of Auroras

Our photographs and observations have borne out the reports of other investigators that there are 12 principal forms of auroras:

1. *Glow.* A faint glow near the horizon, resembling the dawn, usually white or greenish color but sometimes red. This is often the upper part of an arc whose lower border is below the horizon.

2. *Homogeneous Arc.* The arc, when seen near the horizon, is usually diffuse above and sharply defined below, as if cut off by a dark segment of cloud (pages 681, 704). Less frequently in our latitude we see the arc isolated high in the sky, both edges being equally defined. Sometimes several parallel arcs occur and may be connected at one end by a sharp curve. The color is usually greenish yellow or nearly white.

Staff Photographer B. Anthony Stewart

By Telephone the Author Synchronizes His Camera with Another 53 Miles Away

Pairs of photographs taken simultaneously of the same aurora at Ithaca, New York, and at Colgate University, Hamilton, New York, are used in measuring heights of the displays. Measurements are based on difference of the aurora's position with respect to stars in the background of the two pictures (pages 698, 699). Dr. Gartlein, left, prepares to "shoot," while Mrs. Gartlein checks a sequence camera which automatically records the changing forms of auroras every 30 seconds.

The arc often gradually climbs up the sky and may later have a very luminous irregular lower border and soon after break into rays (rayed arc type). The arc is usually set almost at right angles to the geomagnetic meridian. Often only parts of arcs are visible.

3. *Homogeneous Band.* This band has a more irregular form than the homogeneous arc (page 681). It may vary from narrow to very wide. The lower border is often irregular and sharply defined. It may sometimes consist of a segment of approximately semicircular shape which may move across the sky in the direction of the usual arcs. The band may have folds and resemble a large curtain (Plate I and page 675). These usually change into bands with ray structure (rayed band). The color is usually bluish white.

4. *Diffuse Surface.* A diffuse veil or glow, often over large parts of the sky. It may resemble clouds and often appears after rays or curtains. The color may range from violet white to an intense red.

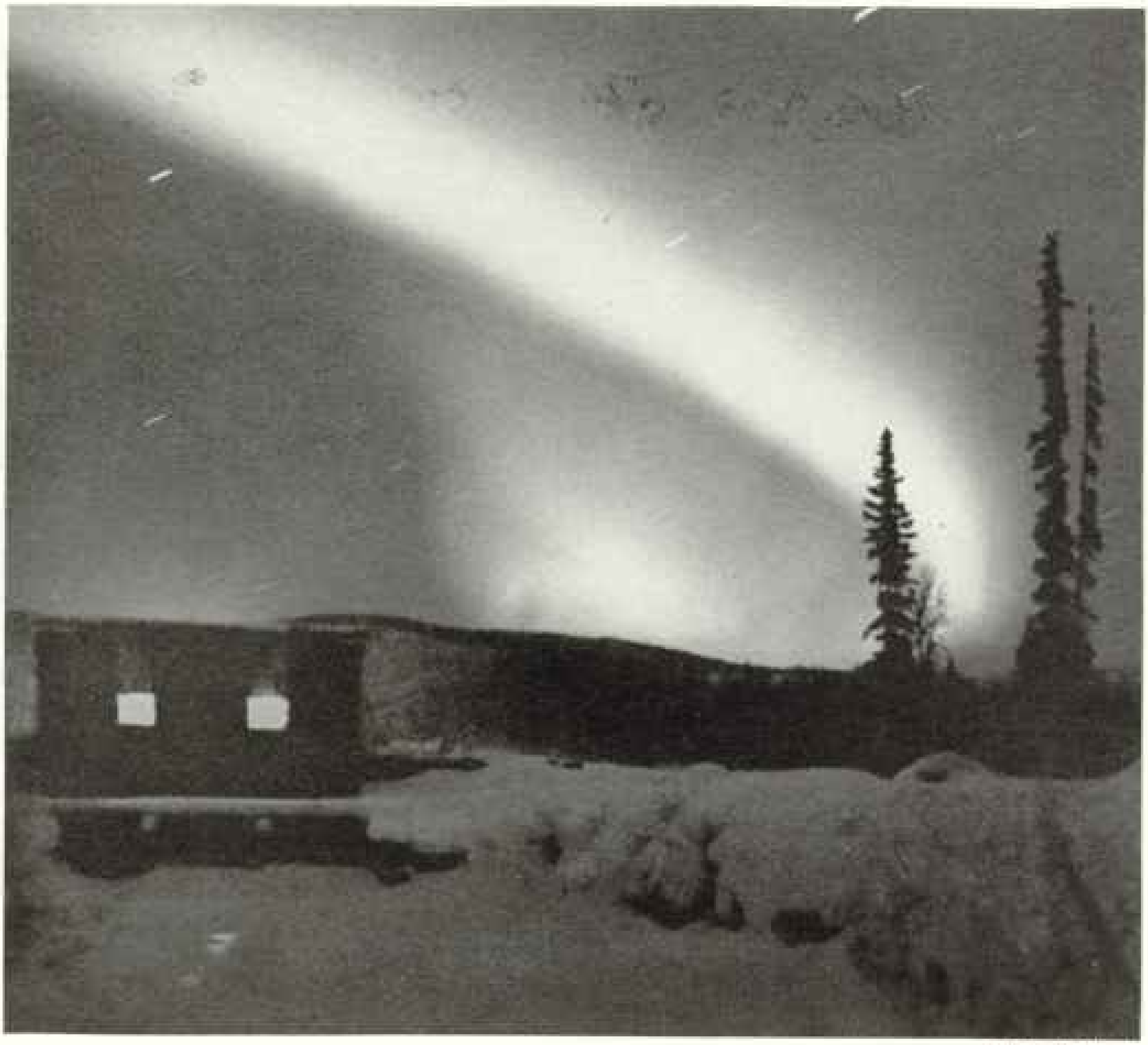
5. *Rays.* Rays resemble searchlight beams in a dusty atmosphere. The rays may appear isolated or in great bundles. They are usually greenish yellow, but may be red. Rays often appear with other auroral forms.

6. *Rayed Arc.* An arc with ray structure (Plate III). A quiet homogeneous arc often becomes very luminous and then breaks into rays. The rays may be short or long and may vary in brightness along their length.

7. *Rayed Band.* A band with ray structure (Plates V and VIII). It resembles the homogeneous band type, but is composed of rays. The rays may be close together or scattered along the band. Several parallel bands may appear. Near the magnetic zenith the bands may form a corona.

8. *Drapery.* When bundles of rays become long, the band often assumes the form of a curtain or drapery. The lower border is often more luminous. Near the zenith it has a fanlike form or partial corona (Plates II and VI and pages 679, 697, and 701).

9. *Corona.* When rays approach the magnetic zenith they seem to converge to a point because



Charles E. Morgan

An Aurora of the Homogeneous Arc Type Shines Brilliantly over the Snows of Canada's Yukon Territory

Arcs of this type, when seen near the horizon, are usually diffuse above and sharply defined below, as shown here. This arc is developing a ray structure in the rear. The color is usually greenish yellow or nearly white.

of perspective. The corona may be formed by long or short rays, by bands or by draperies (Plate IV and page 694).

10. *Pulsating Arc.* Arcs, or parts of them, may flash up and disappear rhythmically with a period of one to 30 seconds. The color is usually bluish green (page 702).

11. *Pulsating Surface.* A diffuse patch or surface which appears and disappears rhythmically. Near the zenith the boundary may be sharper. It often appears with, or as part of, a flaming aurora.

12. *Flaming Aurora.* A fast-moving form consisting of waves of luminosity moving toward the zenith or of invisible waves which cause parts of arcs, bands, or patches to appear and disappear rhythmically. It often appears after strong displays of rays and curtains and is often followed by the formation of a corona.

To this standard classification I have added a thirteenth form.

13. *Old Rays.* Toward the end of a display, rays often become short and form parts of diffuse surfaces; that is, they are fuzzy rays. After the appearance of this form the display does not revive unless a new arc forms (page 700).

Notice of change of address for your National Geographic Magazine *should be received in the offices of the National Geographic Society by the first of the month to affect the following month's issue. For instance, if you desire the address changed for your January number, The Society should be notified of your new address not later than December first. Be sure to include your postal zone number.*

NATIONAL GEOGRAPHIC SOCIETY

GEOGRAPHIC ADMINISTRATION BUILDING
SIXTEENTH AND M STREETS NORTHWEST, WASHINGTON 6, D. C.

GILBERT GROSVENOR, President
ROBERT V. FLEMING, Treasurer
HERBERT A. POOLE, Assistant Treasurer
LYMAN J. BRIGGS, Chairman, Research Committee
ALEXANDER WETMORE, Vice-Chairman, Research Committee

JOHN OLIVER LA GORCE, Vice-President
THOMAS W. McKNEW, Secretary
VERNON H. BREWSTER, Assistant Secretary
MELVIN M. PAYNE, Assistant Secretary
KURTZ M. HANSON, Assistant Secretary

EXECUTIVE STAFF OF THE NATIONAL GEOGRAPHIC MAGAZINE

GILBERT GROSVENOR, EDITOR

JOHN OLIVER LA GORCE, Associate Editor

J. R. HILDEBRAND
Assistant Editor

MELVILLE BELL GROSVENOR
Assistant Editor

JAMES M. DARLEY
Chief Cartographer

NEWMAN BUMSTEAD
Research Cartographer

CHARLES E. RIDDIFORD
Cartographic Staff

WELLMAN CHAMBERLIN
Cartographic Staff

RAYMOND W. WELCH
Director of Advertising

GILBERT G. LA GORCE
Assistant Director of Advertising

FREDERICK SIMPICH
Assistant Editor

McFALL KERBEY
Chief Research Division

LEO A. BORAH
Editorial Staff

FREDERICK G. VOSBURGH
Editorial Staff

LEONARD C. ROY
Chief of School Service

WILLIAM H. NICHOLAS
Editorial Staff

F. BARROWS COLTON
Editorial Staff

INEZ B. RYAN
Research Assistant

FRANKLIN L. FISHER
Chief Illustrations Division

MAYNARD OWEN WILLIAMS
Chief Foreign Editorial Staff

W. ROBERT MOORE
Foreign Editorial Staff

LUIS MARDEN
Foreign Editorial Staff

THEODORE F. KOOP
Chief News Bulletin Service

EDWIN L. WISHERD
Chief Photographic Laboratory

WALTER MEAYERS EDWARDS
Illustrations Division

KIP ROSS
Illustrations Division

BOARD OF TRUSTEES

CHARLES EVANS HUGHES
Formerly Chief Justice of the United States

WALTER S. GIFFORD
President American Telephone and Telegraph Co.

WILLIAM V. PRATT
Admiral U. S. Navy, Retired

LYMAN J. BRIGGS
Director National Bureau of Standards, Retired

EMORY S. LAND
Vice Admiral Construction Corps, U. S. Navy, Retired; President, Air Transport Association

GEORGE R. PUTNAM
Commissioner of Lighthouses, Retired

L. O. COLBERT
Rear Admiral, Director U. S. Coast and Geodetic Survey

FRANKLIN L. FISHER
Chief Illustrations Division, National Geographic Magazine

ROBERT V. FLEMING
President and Chairman of the Board, Riggs National Bank

H. H. ARNOLD
General of the Army, Retired
Formerly Commanding General U. S. Army Air Forces

LEROY A. LINCOLN
President Metropolitan Life Insurance Company

JUAN T. TRIPPE
President Pan American Airways

DAVID FAIRCHILD
Special Agricultural Explorer, U. S. Department of Agriculture

ALEXANDER WETMORE
Secretary Smithsonian Institution

GILBERT GROSVENOR
Editor of National Geographic Magazine

MELVILLE BELL GROSVENOR
Assistant Editor, National Geographic Magazine

JOHN J. PERSHING
General of the Armies of The United States

CHARLES F. KETTERING
President General Motors Research Corporation

CHARLES G. DAWES
Formerly Vice-President of the United States

ELISHA HANSON
Lawyer and Naturalist

LLOYD B. WILSON
Chairman of the Board Chesapeake and Potomac Telephone Companies

ERNEST E. NORRIS
President Southern Railway System

JOHN OLIVER LA GORCE
Associate Editor of the National Geographic Magazine

J. R. HILDEBRAND
Assistant Editor, National Geographic Magazine

ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

To carry out the purposes for which it was founded fifty-nine years ago, the National Geographic Society publishes this Magazine monthly. All receipts are invested in The Magazine itself or expended directly to promote geographic knowledge.

Articles and photographs are desired. For material The Magazine uses, generous remuneration is made.

In addition to the editorial and photographic surveys constantly being made, The Society has sponsored more than 100 scientific expeditions, some of which required years of field work to achieve their objectives.

The Society's notable expeditions have pushed back the historic horizons of the southwestern United States to a period nearly eight centuries before Columbus crossed the Atlantic. By dating the ruins of the vast communal dwellings in that region, The Society's researches solved secrets that had puzzled historians for three hundred years.

In Mexico, The Society and the Smithsonian Institution, January 16, 1939, discovered the oldest work of man in the Americas for which we have a date. This slab of stone is engraved in Mayan characters with a date which means November 4, 291 B. C. (Spinden Correlation). It antedates by 200 years anything heretofore dated in America, and reveals a great center of early American culture, previously unknown.

On November 11, 1935, in a flight sponsored jointly by the National Geographic Society and the U. S. Army Air Corps, the world's largest balloon, *Explorer II*, ascended to the world altitude record of 72,395 feet. Capt. Albert W. Stevens and Capt. Orvil A. Anderson took aloft in the gondola nearly a ton of scientific instruments, and obtained results of extraordinary value.

The National Geographic Society-U. S. Navy Expedition camped on desert Canton Island in mid-Pacific and successfully photographed and observed the solar eclipse of 1937. The Society has taken part in many projects to increase knowledge of the sun.

The Society cooperated with Dr. William Beebe in deep-sea explorations off Bermuda, during which a world record depth of 3,028 feet was attained.

The Society granted $25,000, and in addition $75,000 was given by individual members, to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees in the Giant Forest of Sequoia National Park of California were thereby saved for the American people.

One of the world's largest icefields and glacial systems outside the polar regions was discovered in Alaska and Yukon by Bradford Washburn while exploring for The Society and the Harvard Institute of Exploration, 1938.

Copyright, 1947, by National Geographic Society, Washington, D. C. International Copyright secured. All rights reserved. Quedan reservados todos los derechos.
Printed in U. S. A. Entered at the Post Office at Washington, D. C., as Second-Class Mail Matter. Acceptance for mailing at special rate of postage provided for in Sec. 1103, Act of October 3, 1917, authorized July 1, 1918. Cover design and names registered in United States Patent Office. Marca Registrada.

DELICATELY FORMED MUSICIAN FIGURINE, T'ANG DYNASTY CIRCA 800 A. D. COURTESY METROPOLITAN MUSEUM OF ART

"Third Dimension Beauty"... the ultimate in silvercrafting... is found only in WALLACE STERLING

In your selection of cherished solid silver you will naturally be satisfied with nothing less than superlative silversmithing. "Third Dimension Beauty" . . . exclusive with Wallace Sterling . . . expresses this exquisite artistry at its finest. Wallace Sterling's "Third Dimension Beauty" patterns are sculptured . . . each piece of silver is given full body and complete form on the sides and back as well as on the front. From left to right: Stradivari, Sir Christopher, Grand Colonial, Grande Baroque, Rose Point. Six-piece place settings include luncheon knife, luncheon fork, cream soup spoon, teaspoon, salad fork, butter spreader, about $25 to $30. For your copy of the book, "Beauty Moods in Silver", send 25¢ to Department G.

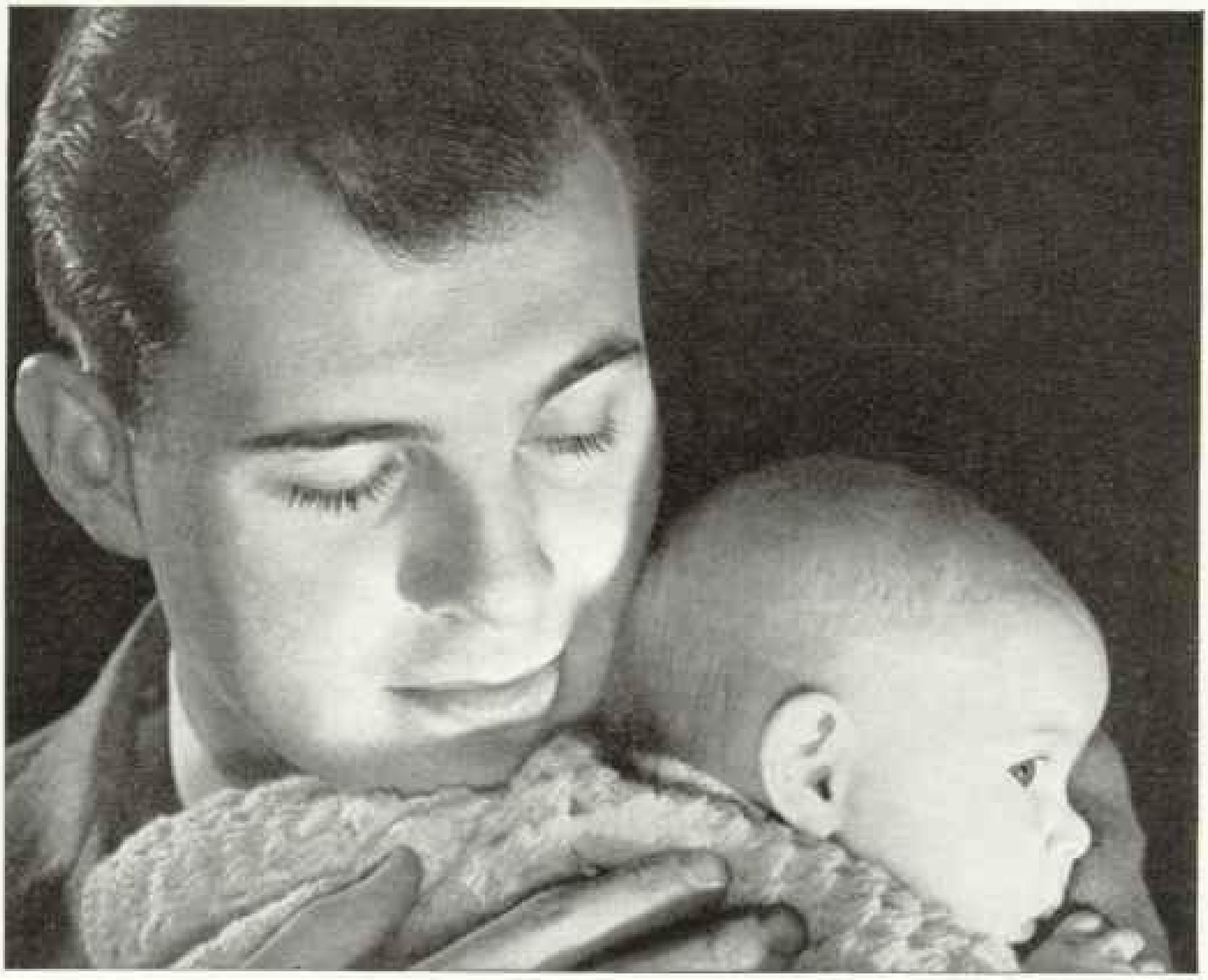
©1947 Wallace Silversmiths, Wallingford, Conn. • Wallace Silversmiths, Toronto, Canada

THIRD DIMENSION BEAUTY

Beauty in Front *Beauty in Profile* *Beauty in Back*

YOU CHOOSE STERLING ONCE FOR A LIFETIME...SO NOTHING LESS THAN THE FINEST WILL SATISFY

THE FUTURE BELONGS TO THOSE WHO PREPARE FOR IT



Firstborn

New baby . . . and with its coming comes great new hope for the future. For in your child you feel your own unrealized dreams can yet come true . . . you see a chance for him to make an even better life than yours has been.

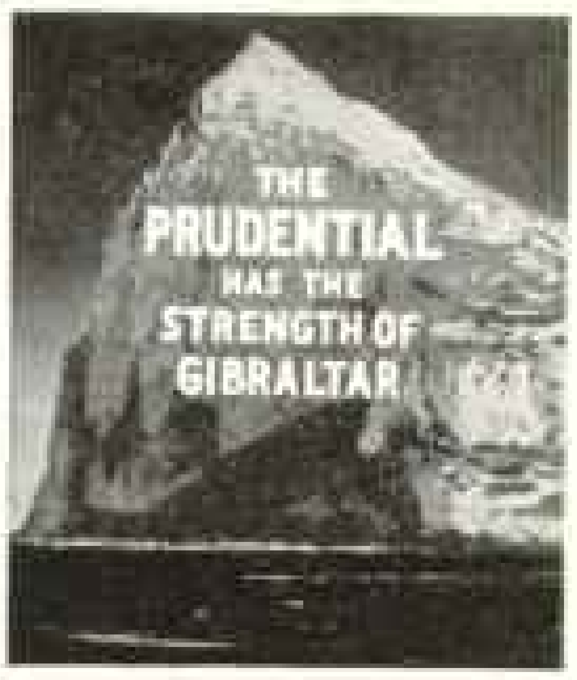
But as you look forward to these happy possibilities, it is wise to make sure of factors necessary to their fulfillment: education, training, protection against financial emergencies.

That is why so many American fathers rely on Prudential life insurance—for The Prudential can protect a child's future in many ways. Among these are: providing money to take care of him if you should die while he is still young—to pay for his schooling—even for starting him off on his own when he becomes a man. And a Prudential program is easily adapted to fit your child's progress and your family's changing needs.

Any Prudential representative will show you how to fit such a program to your particular circumstances, and will explain the special advantages Prudential has to offer. Arrange to see him about this most important matter—*soon.*

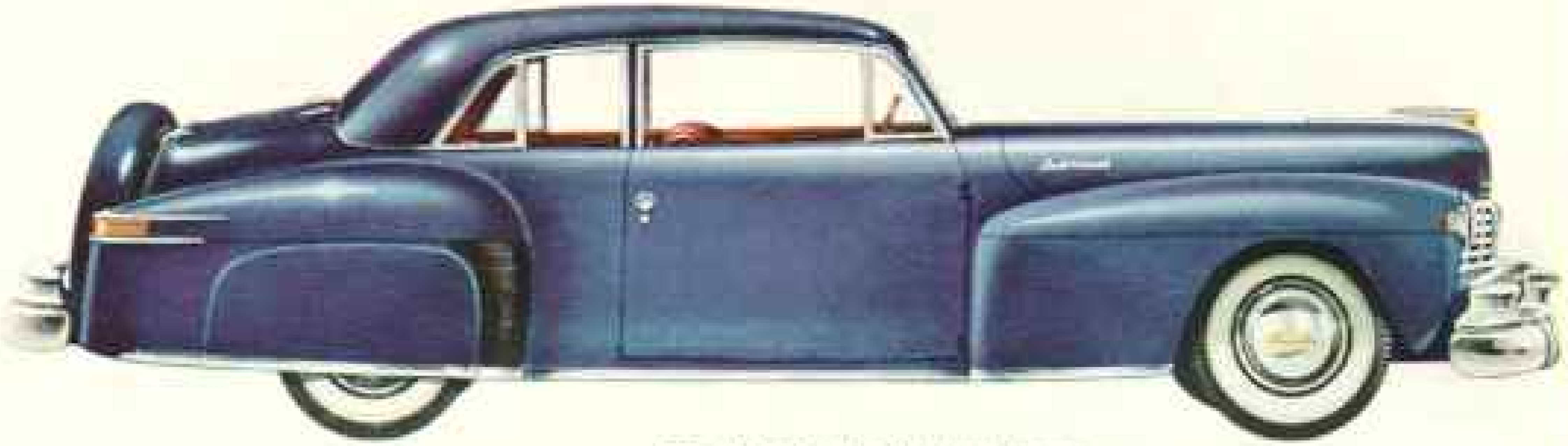
★

Enjoy the Prudential Family Hour, with Rise Stevens—Every Sunday, CBS. And the Jack Berch Show—Every morning, Monday through Friday, NBC.



THE PRUDENTIAL

INSURANCE COMPANY OF AMERICA
A mutual life insurance company
HOME OFFICE: NEWARK, NEW JERSEY



The Lincoln Continental Coupe

Nothing

could be finer

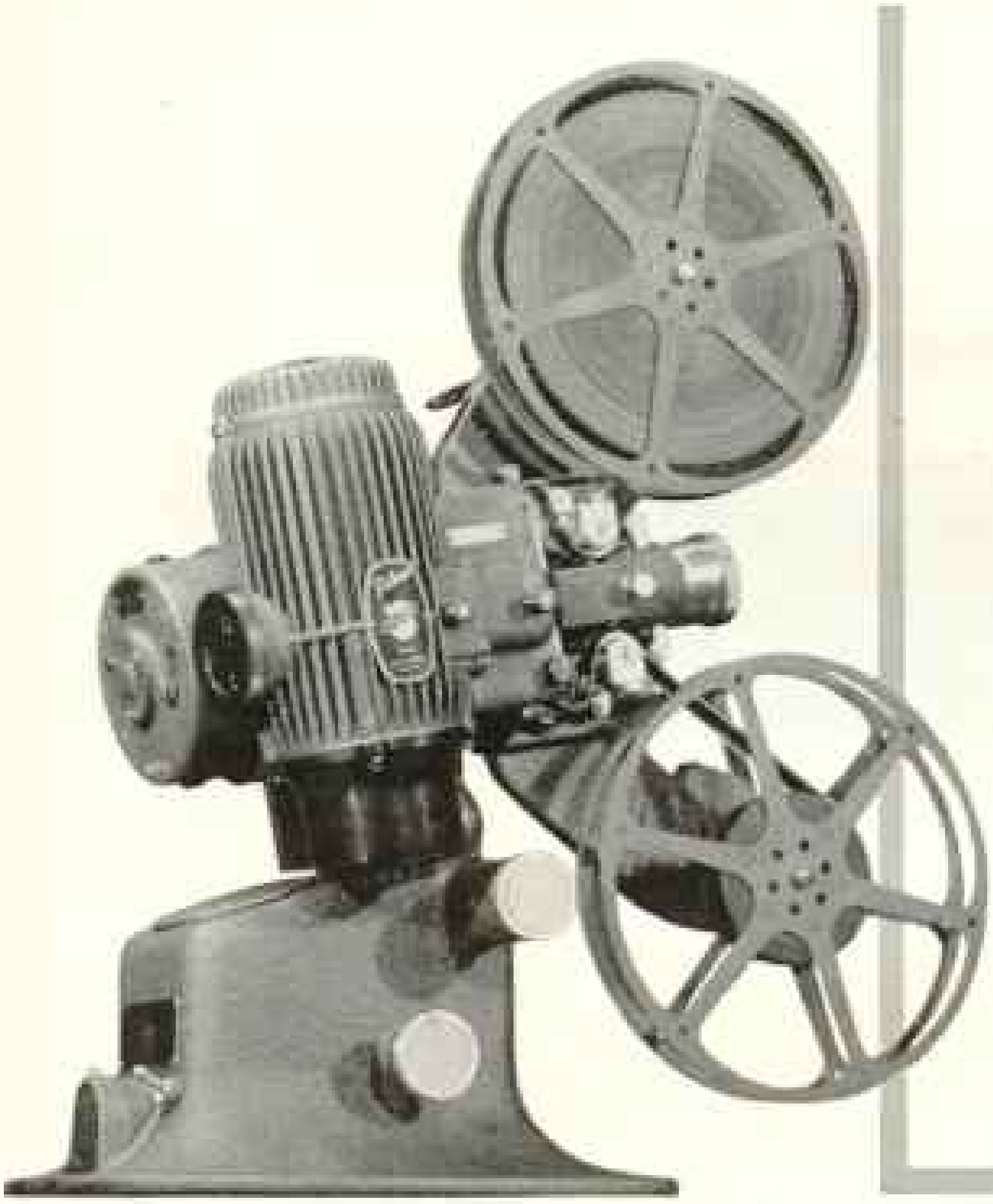
When available, white sidewall tires at extra cost.

Lincoln

DIVISION OF FORD MOTOR COMPANY

Ever *really* *see* your movies?

You'll be amazed at how your 16mm movies will gain in brilliance and beauty when shown with this improved



Filmo Diplomat Projector

Its 1000-watt illumination through a fast, F1.6, Filmocoted lens will enhance your friends' respect for your photographic ability. Its rock-steady, flicker-free projection is kind to the eyes. Its complete film protection will safeguard your irreplaceable pictures. The Diplomat is a perfect companion-piece for a Filmo Camera because the film movement mechanisms are matched.

Get a Filmo Diplomat now, and you'll *really see* your films.

Filmo Auto Load Camera

Loads in an instant with 16mm film magazine, color or black-and-white. Built-in guide tells how to set the lens for any film, any outdoor condition. Then sight through the brilliant viewfinder and shoot! You'll get *theater-quality* movies, because this fine camera reflects Bell & Howell's forty successful years of meeting Hollywood's professional equipment needs.

See these and other Filmos at better photographic dealers or write for details to Bell & Howell Company, 7104 McCormick Road, Chicago 45. Branches in New York, Hollywood, Washington, D. C., and London.

1907
40th
ANNIVERSARY
1947

Precision-Made by

Bell & Howell

Since 1907 the Largest Manufacturer of Professional Motion Picture Equipment for Hollywood and the World

The greatest improvement IN RECORD PLAYING *since the invention of the phonograph*

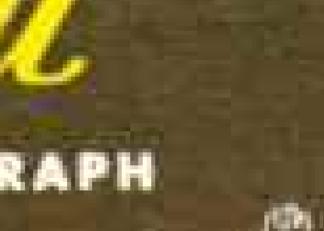
It's new! It's beautiful! It has everything! New pull-out phonograph makes record loading easy. New high speed changer plays up to 12 records automatically. New static-free FM radio with tilt-tuning dial. Choice of walnut, mahogany or blond period cabinet with compartment for 144 records in albums. See it . . . hear it . . . at your Admiral dealer, today. Walnut only **$289⁹⁵** (Slightly higher in west and south.)

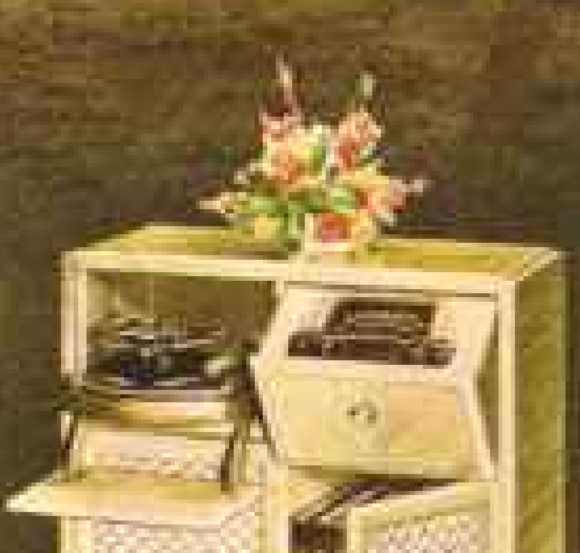
America's Smart Set

Admiral

FM-AM RADIO-PHONOGRAPH

with Miracle Tone Arm

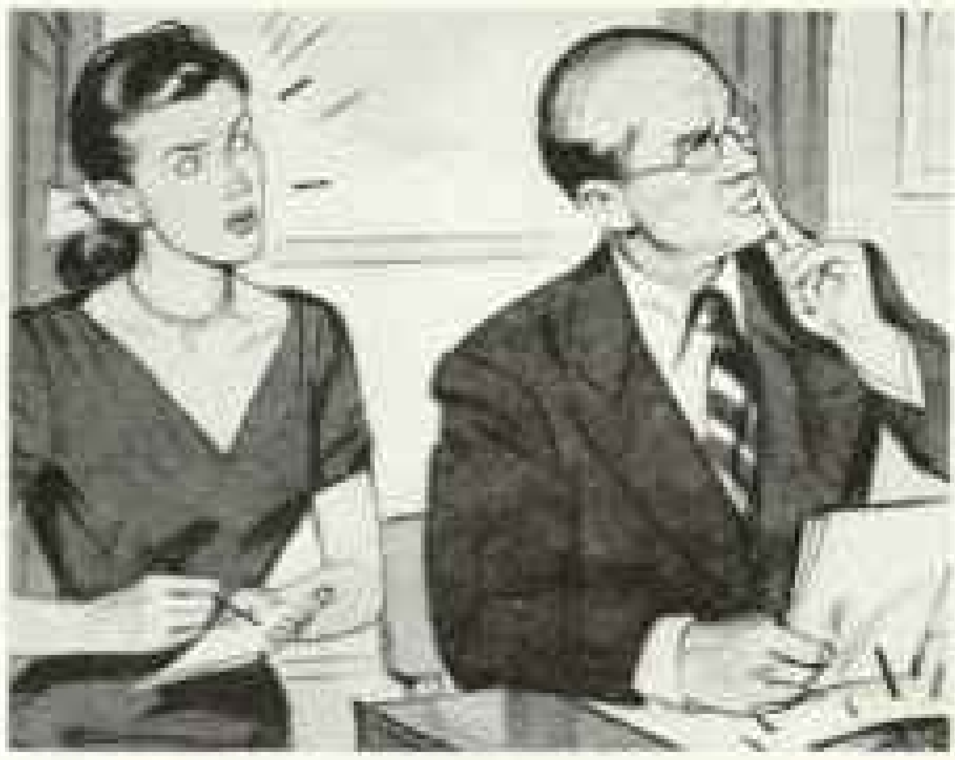


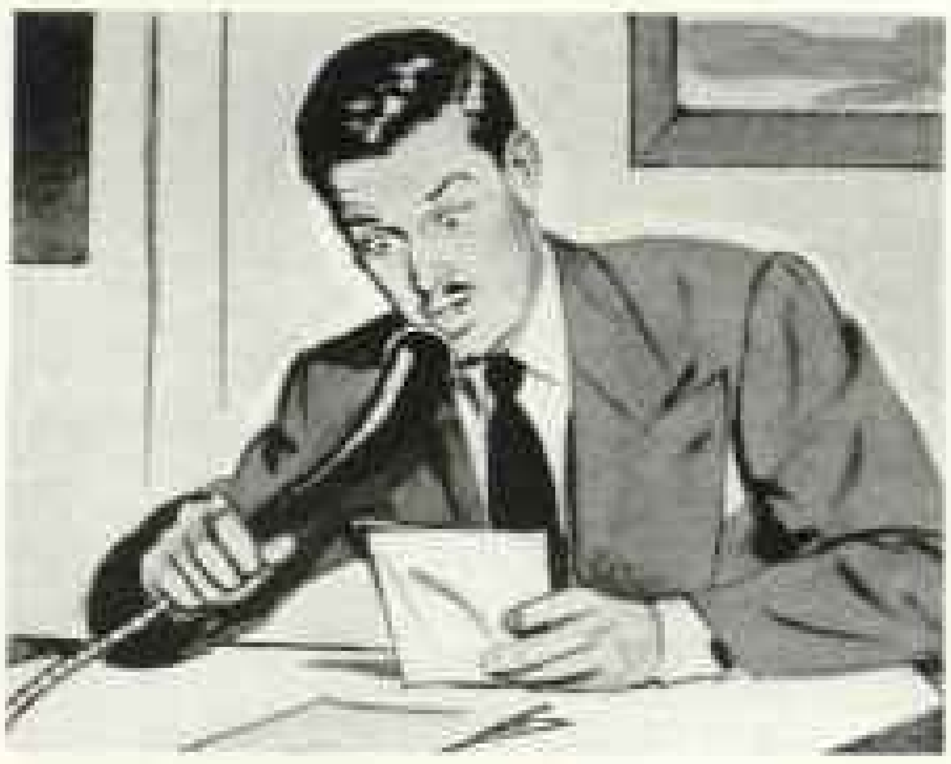


Miracle tone arm brings a new thrill to your record listening pleasure. Uses no coil, no crystal, no filament, no special tube. Banishes needle scratch, "talk-back" or other disturbing noises. Keeps records like new for hundreds of plays longer.

Gown—Fred A. Block Original

What's wrong with these first two pictures?





1. Everything's wrong here! Man-to-secretary dictation belongs to another era. Slow, tedious—inconvenient for both boss and secretary—it stands in the way of the modern business tempo.

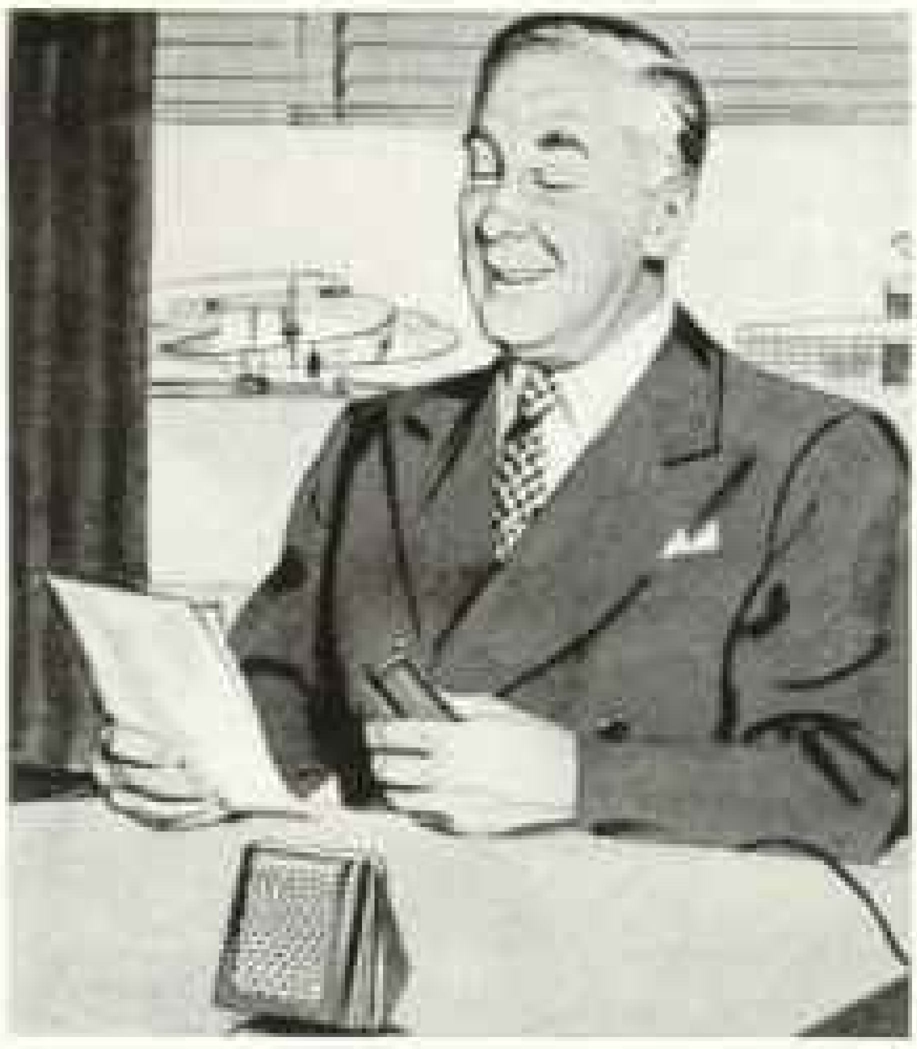
2. Better, but far from perfect! Acoustic dictating machines free the secretary and speed office work—yet, in comparison with electronic machines, they're not nearly as easy to operate, not as perfect in voice reproduction.

3. Everything's right when you use Dictaphone Electronic Dictation! Pioneered by Dictaphone Corporation, this great new development means easier operation, better recording, clearer reproduction.

Instead of enunciating each word directly into a speaking tube, you can sit back and relax.

The Dictaphone microphone catches and faithfully reproduces every word—even a whisper. Your secretary can transcribe *with* ease—*without* error.

Your Dictaphone *Electronic* Machine is as dependable as only the world's largest manufacturer of dictating equipment can make it. For a demonstration, call your local Dictaphone representative. For descriptive literature, write Dictaphone Corporation, Dept. B-11, 420 Lexington Ave., New York 17, N. Y.

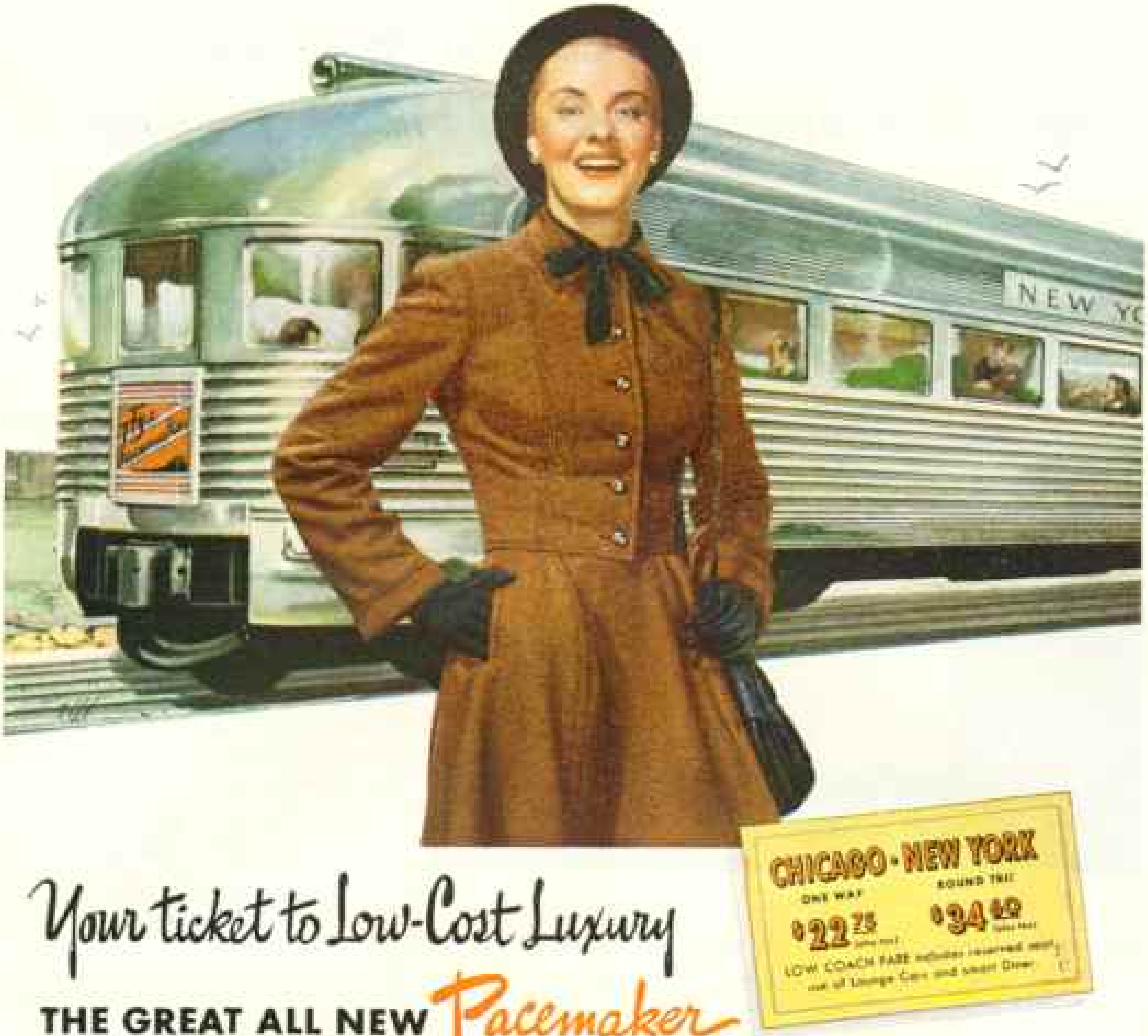


Model AE, with either hand or desk microphone.

The word DICTAPHONE is the registered trade-mark of Dictaphone Corporation, makers of Electronic dictating machines and other sound-recording and reproducing equipment bearing said trade-mark.

DICTAPHONE

Electronic Dictation



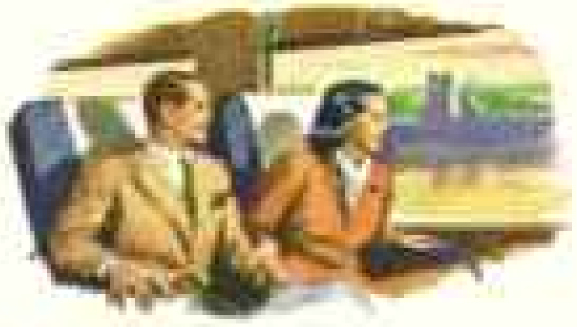
Your ticket to Low-Cost Luxury

THE GREAT ALL NEW *Pacemaker*

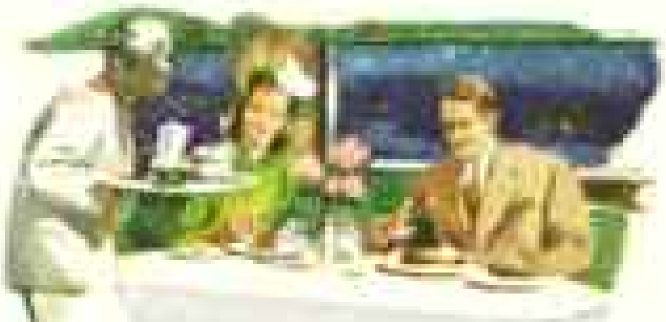
Soon, your *Pacemaker* ticket will mean more than ever in low-cost luxury. For soon this famous New York Central coach streamliner will be gleamingly, luxuriously new from end to end.

As always, the *Pacemaker* will be yours from end to end at New York Central's regular low coach fares. As always, too, the *Pacemaker* will streak nightly between New York and Chicago on a schedule almost as fast as that of the 20th Century Limited.

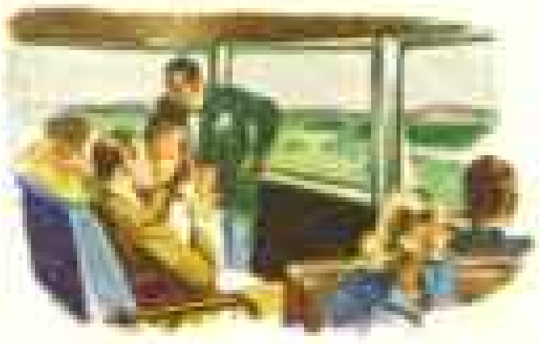
And the *Pacemaker* is not alone! All over the Water Level Route, world's largest fleet of postwar coaches now brings you air-conditioned travel that's *fare*-conditioned, too!



New **Custom-Built Coaches!**
Air-conditioned, with deep, lean-back seats, wide windows, fluorescent lights, and many another luxury 5,000 Central passengers said they wanted.



New **"King Size" Dining Cars!**
Each so spacious it needs a separate kitchen car to prepare those delicious meals which you select from the *Pacemaker's* special money-saving menu.



New **Luxury Lounge Cars!**
Both a Tavern Lounge and an Observation Car will be yours for a change of scene . . . music, refreshments, a quiet game or chat on the all-coach *Pacemaker*.

NEW

NEW YORK CENTRAL

The Scenic Water Level Route

NEW YORK CENTRAL SYSTEM

Enjoy better food at low cost with a General Electric Home Freezer

You can keep most food fresh, flavorful and nutritious for 6 months to a year in a General Electric Home Freezer.

You can buy your food in the flush seasons—when prices are lowest. You can buy the choicest meats, fish, prize vegetables and fruits at their flavor peak. You enjoy better food at low cost.

The freezer to buy

The home freezer you want, of course, is the one that gives you the most dependable service at the lowest operating cost. When you compare we believe you will agree that a General Electric is the *best* home freezer—*bar none!!*

The hermetically sealed General Electric freezing unit is the same mechanism used in General Electric Refrigerators. *More than a million of these refrigerator units have been giving satisfactory service for 10 years or more.*

The General Electric *Perfect Seal* Cabinet hoards cold. *In repeated laboratory tests, it proved so efficient that it kept food frozen for several days after the current was shut off.*

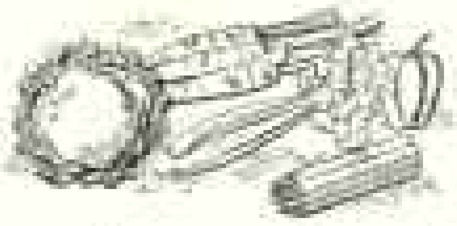
There's no other freezer that gives you *all* the advantages of a dependable General Electric Home Freezer. It's your *best* buy! General Electric Company, Bridgeport 2, Conn.

Have the food you want when you want it

You can have strawberries in January—*at June prices.* You can freeze luscious fruits at their peak of flavor—enjoy them any time of the year.

Those wonderful catches of fish that dad brings home need not be eaten all at once. In the General Electric Home Freezer they'll stay succulent until you crave them.

Those prize pheasants, venison and other game that come into your home (depending upon local game law) can be saved for very special occasions.

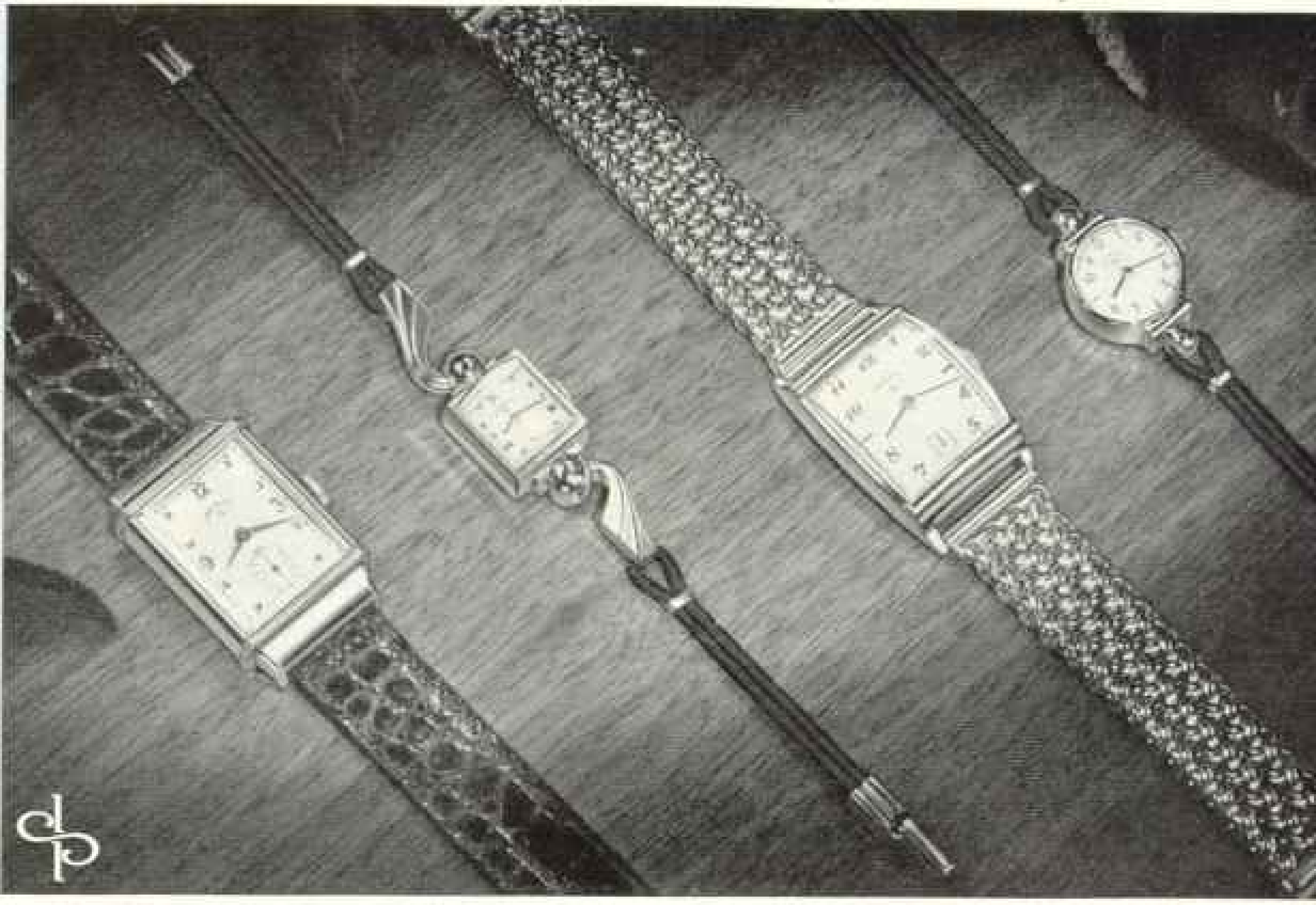


When you have a General Electric Home Freezer you can buy the choicest vegetables when prices are lowest. You freeze them and enjoy them months later.

You can have the finest food on your table at all times. The General Electric 8-cu-ft freezer holds 280 pounds. (Also available in 4-cu-ft freezer.)

GENERAL ELECTRIC

Lord and Lady Elgins are priced from $65.00 to $5000. Elgin De Luxe from $47.50 to $100.00. Other Elgins as low as $29.75. All prices include Federal Tax.



LOOK FOR THIS SYMBOL ON THE DIAL

MADE IN AMERICA BY AMERICAN CRAFTSMEN

THESE BEAUTIFUL NEW WATCHES, BEING *Elgins*, CONTAIN

The most important watchmaking development in over 200 years!

THE DURAPOWER MAINSPRING* eliminates 99% of watch repairs due to steel mainspring failures! It completely overcomes the commonest cause of their breaking—rust. It *will not rust!* And it will retain its "springiness" indefinitely for greater accuracy through the years! See, at your jeweler's, the beautiful, new Elgin Watches. They all have these miracle mainsprings . . . . *at no extra cost.* They all have rust-proof Elginite Alloy Hairsprings, too; are factory adjusted to temperatures and positions.

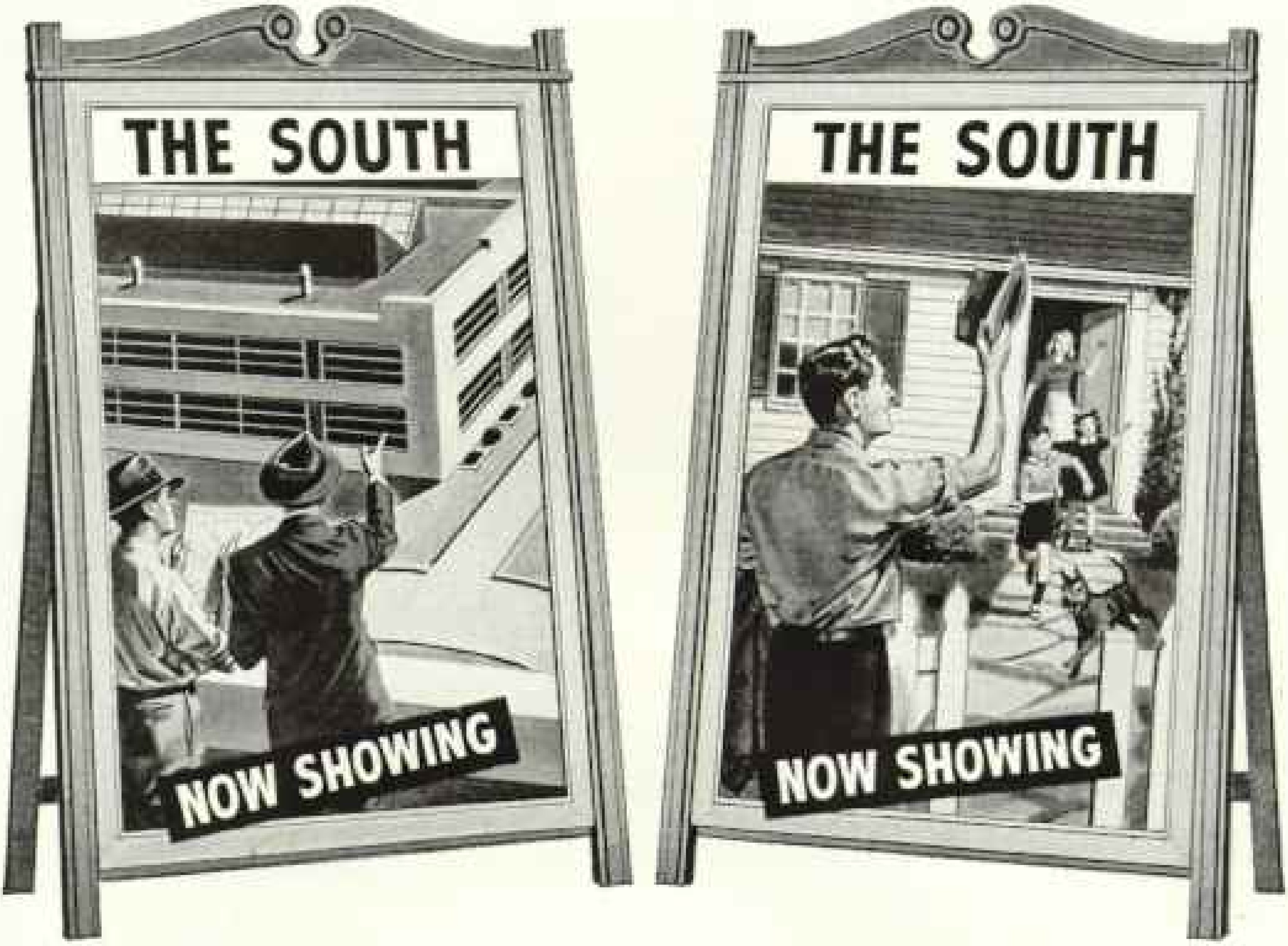
Only an ELGIN *has the DuraPower Mainspring*

MADE OF "ELGILOY" METAL

Now to Elgin's famous star-timed accuracy the DuraPower Mainspring adds a permanency of timekeeping performance never before possible in any watch. Elgin observatory time from the stars, by the way, is the official time of United Air Lines.

Hear Elgin's **"2 HOURS OF STARS"** *on Thanksgiving Day. Coast to coast.*

*Patent Pending



Double Feature—Now Showing

Where?

Almost everywhere along the 8,000-mile Southern Railway System that "Serves the South."

One is a drama of "discouraged factories" migrating to the Southland of limitless opportunity—and growing prosperous, big and confident.

The other is an inspiring story of people who believe in *"a good day's work for a good day's pay"* . . . and in all the other traditions that made America great.

It's a drama of friendly cities and towns ...comfortable homes...healthy youngsters romping happily in the sun...and skilled, willing workers turning out the myriad products of modern industry.

This "double feature" is the reason why far-sighted industrialists:

"Look Ahead—Look South!"

Ernest E. Norris

President

LOOK AHEAD LOOK SOUTH

SOUTHERN RAILWAY SYSTEM

The Southern Serves the South

"A feast for a king," Robin called it

Under great oaks in Sherwood Forest Robin Hood and his stout yeomen flung themselves down to laugh and rest after forays. With appetites born of adventure, the band turned to a hearty meal. Crusty brown bread . . . and fair yellow *cheese*.

Since men first learned to tend herds, cheese has nourished human bodies. It is still one of the world's great foods. For it is a concentrate of milk, nature's most nearly perfect food. And we know far more of the science of cheese-making today—largely through the research of National Dairy's Kraft Foods Company.

Cheese is an important part of the American diet. Its proteins, vitamins and minerals contribute to the national health. Its widespread use means a bigger market for the dairy farmer's products.

And now it is *easier* to serve *better* cheese. National Dairy has developed new cheeses, improved old ones . . . perfected the pasteurization of cheese . . . created hundreds of new cheese dishes.

The research goes forward constantly, in order that America may always enjoy bread . . . and *finer* cheese.

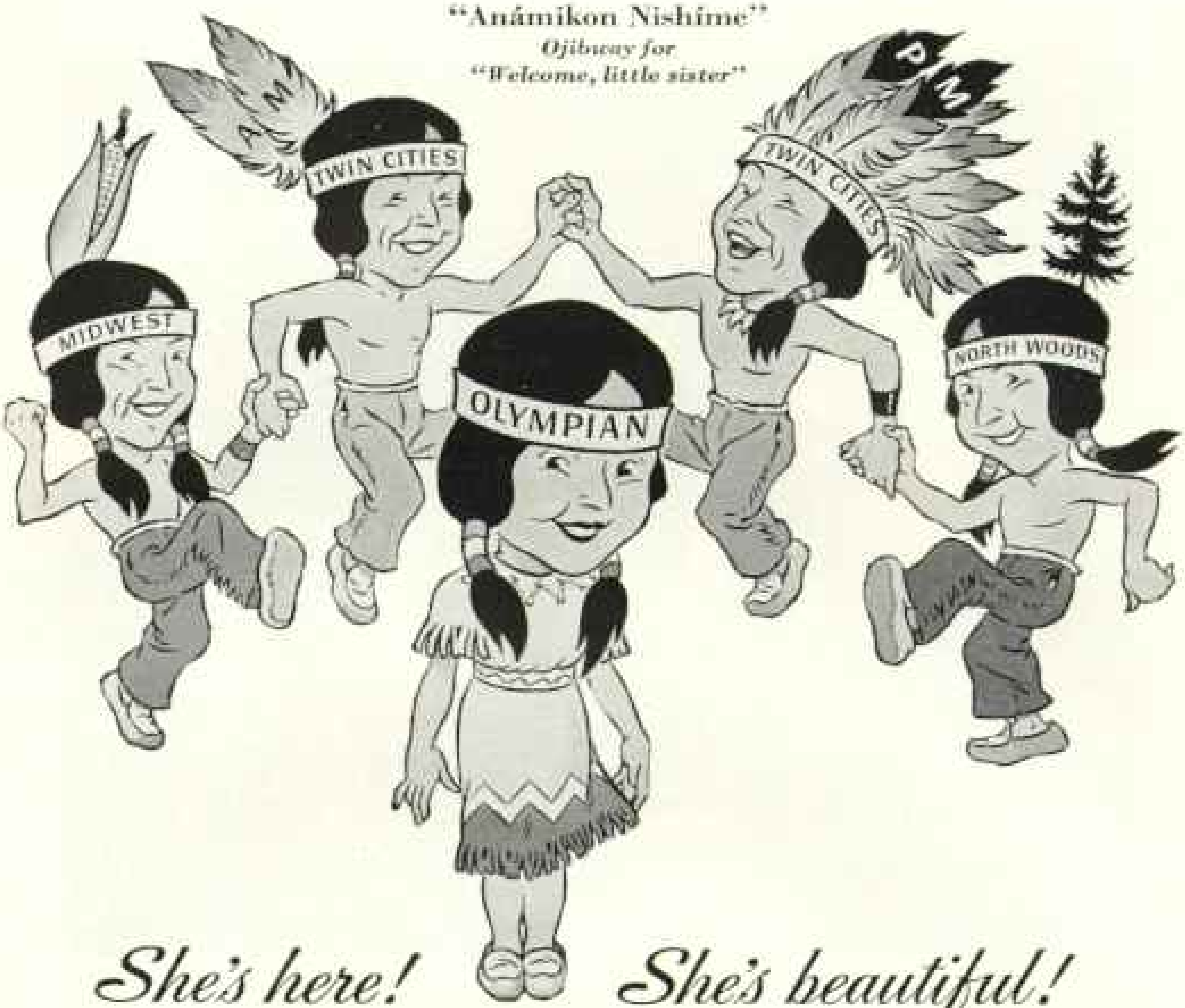
Dedicated to the wider use and better understanding of dairy products as human food . . . as a base for the development of new products and materials . . . as a source of health and enduring progress on the farms and in the towns and cities of America.

Kraft Sealtest Breyers

These brands assure you of highest quality

NATIONAL DAIRY
PRODUCTS CORPORATION

"Anámikon Nishime"
Ojibway for
"Welcome, little sister"



She's here! She's beautiful!

TWIN CITIES
Hiawathas
TWO A DAY - EACH WAY
CHICAGO • MILWAUKEE
LA CROSSE • WINONA
ST. PAUL • MINNEAPOLIS

NORTH WOODS
Hiawatha
THE FISHERMAN'S FRIEND
SERVING THE BEAUTIFUL
UPPER WISCONSIN VALLEY
MINOCQUA • WOODRUFF

MIDWEST
Hiawatha
THRU THE CORN BELT
CHICAGO • CEDAR RAPIDS
DES MOINES • OMAHA
SIOUX CITY • SIOUX FALLS

Olympian Hiawatha

CHICAGO • MONTANA • WASHINGTON

Though only a few months old, the OLYMPIAN HIAWATHA has already won acclaim as Queen of the Hiawatha fleet.

The OLYMPIAN HIAWATHA offers a full range of accommodations for long distance travel. Many *brand new* features: Touralux sleepers with longer, higher, wider berths at lower prices! New type cars for dining and lounging—the angle-seated diner and the Tip Top Grill car.

Ride the swift running OLYMPIAN HIAWATHA on your next cross country trip. Your first glimpse of this new Queen will draw a long, low whistle of approval. For information, write: F. N. Hicks, Passenger Traffic Manager, 708 Union Station, Chicago 6, Ill.

THE MILWAUKEE ROAD
Speedway of the Speedliners

New Philco Discovery...

BANISHES SURFACE NOISE AND RECORD SCRATCH

At last, flawless reproduction of any record, old or new, thanks to the *Philco Electronic Scratch Eliminator* . . . an amazing development of Philco research. You hear the brilliant "highs", the mellow "lows", the exquisite soft passages *against a background of utter silence.* Hear the magnificent Chippendale Philco 1270 . . . it's a thrilling musical experience!

With PHILCO

Advanced-FM

The revolutionary Philco system that actually **ignores noise** and gives you the purest, clearest FM reception ever achieved!

PHILCO

Famous for Quality the World Over

Wednesday is Bingsday! Listen to Philco Radio Time starring BING CROSBY Wednesday, 10 P.M. in the East, 9 P.M. everywhere else . . . ABC Network and many additional stations.

A MESSAGE FROM BRITAIN

We in Britain look forward to welcoming you, the people of America, to our friendly shores next year.

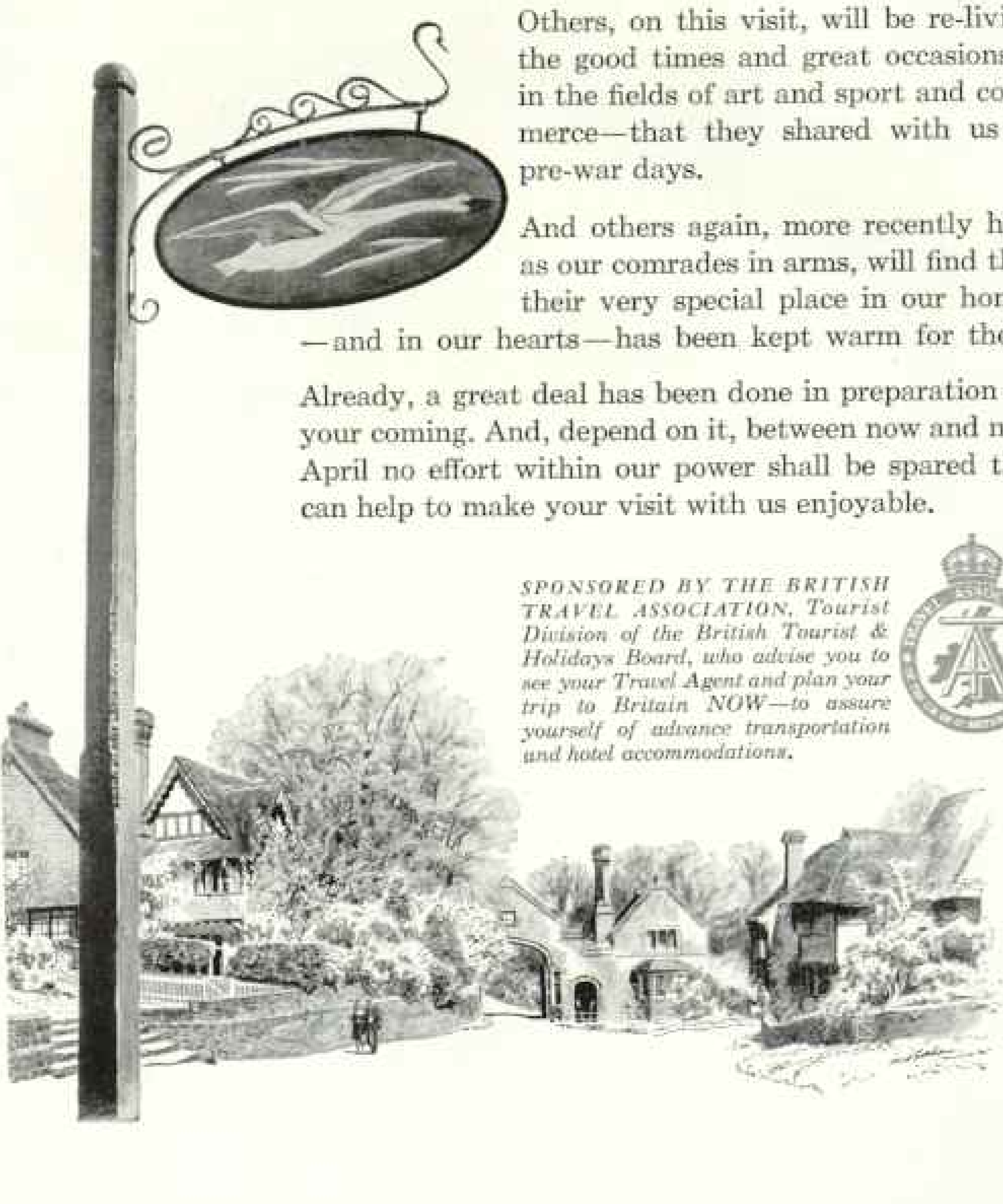
In spite of many difficulties or temporary restrictions we may be enduring, we can still offer you the warmth of our hospitality, the inspiration of our ancient places and the evergreen loveliness of our countryside.

For some of you, this will be a first experience of the British Isles—with all their old-world color and pageantry, their wide choice of modern diversions and events.

Others, on this visit, will be re-living the good times and great occasions—in the fields of art and sport and commerce—that they shared with us in pre-war days.

And others again, more recently here as our comrades in arms, will find that their very special place in our homes—and in our hearts—has been kept warm for them.

Already, a great deal has been done in preparation for your coming. And, depend on it, between now and next April no effort within our power shall be spared that can help to make your visit with us enjoyable.



SPONSORED BY THE BRITISH TRAVEL ASSOCIATION, Tourist Division of the British Tourist & Holidays Board, who advise you to see your Travel Agent and plan your trip to Britain NOW—to assure yourself of advance transportation and hotel accommodations.

RCA TV
Television

Ultrasensitive RCA television camera tube cuts studio light requirements 90%.

Television finds drama in the dark — with new RCA studio camera

Now television becomes even more exciting as lights are dimmed and the camera reaches deep inside studio shadows to capture action as dramatic as any on stage or screen…

A new studio television camera—developed by RCA scientists and engineers—needs only 1/10th the usual amount of light.

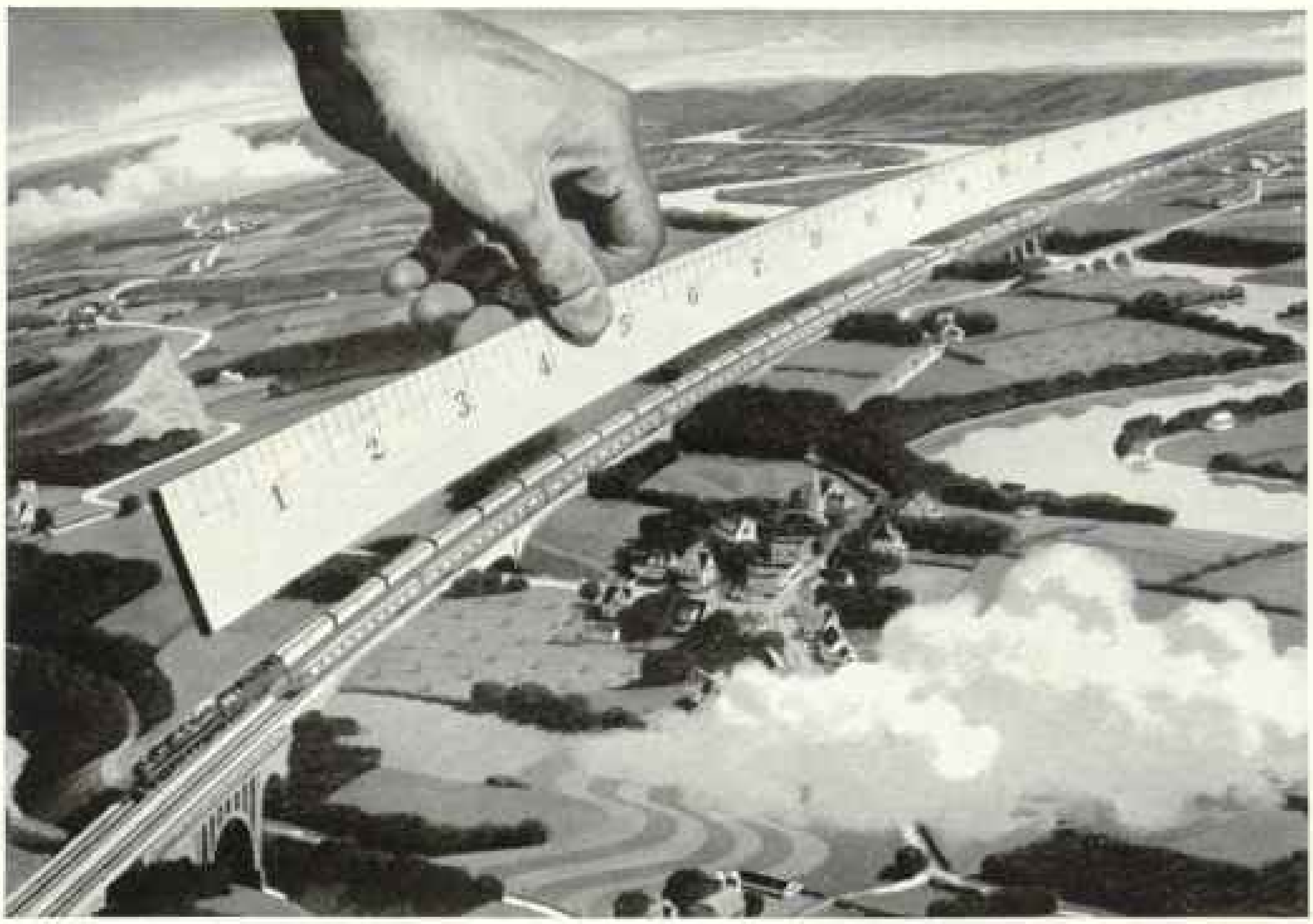
The super-sensitive eye of the new camera is an improved Image Orthicon Tube…of the type once used only outdoors. With it, studio broadcasts are sharper, clearer—and since so very little illumination is needed, heat in the studio is reduced to a minimum. No more blazing lights!

Such improvements come regularly from research at RCA Laboratories, and apply to all branches of radio, television, electronics, and recording. These up-to-the-minute improvements are part of your purchase of any product bearing the name RCA, or RCA Victor.

When in Radio City, New York, be sure to see the radio and electronic wonders at RCA Exhibition Hall, 36 West 49th St. Free admission. *Radio Corporation of America, RCA Building, Radio City, New York 20, New York.*

RCA Victor home television receivers bring you every dramatic effect the camera catches. RCA's "Eye Witness Television" locks pictures in tune with the sending station. Let your dealer demonstrate.

RADIO CORPORATION of AMERICA



227,000-MILE YARDSTICK

Railroad progress speaks for itself. But it is not *measured* in talk.

It is measured by the exact yardstick of *results* . . . results which show up in better service to the public by all American railroads—227,000 miles of them.

Results in better passenger service:

Railroads were pioneers in air conditioning. Today practically every passenger car on principal runs is air conditioned. Back in 1934, railroads introduced streamlined trains. And—although no passenger equipment could be built in the war years—today around 150 of these trains, sleek symbols of modern transportation, cover 100,000 miles every 24 hours. Many more are being built!

Results in more efficient freight service:

The work done each day by the average freight car *practically doubled* between 1926 and 1946. And in the first five months of 1947 it was almost 10% more than that! That's one big reason why railroads are able to handle the greatest peacetime traffic in history with fewer freight cars than they have had in many years!

Results in greater safety:

In 1946 collision, derailment, and other train accidents resulted in only one passenger fatality for each 996,000,000 miles traveled!

These facts are yardsticks of railroad progress.

Railroad progress is the product of many minds . . . of much planning . . . of constant research . . . of wide cooperation and the expenditure of billions of dollars. And in measuring progress, it's not promises but *results* that count.

TO CONTINUE THIS PROGRESS

. . .—the railroads must earn an adequate income.

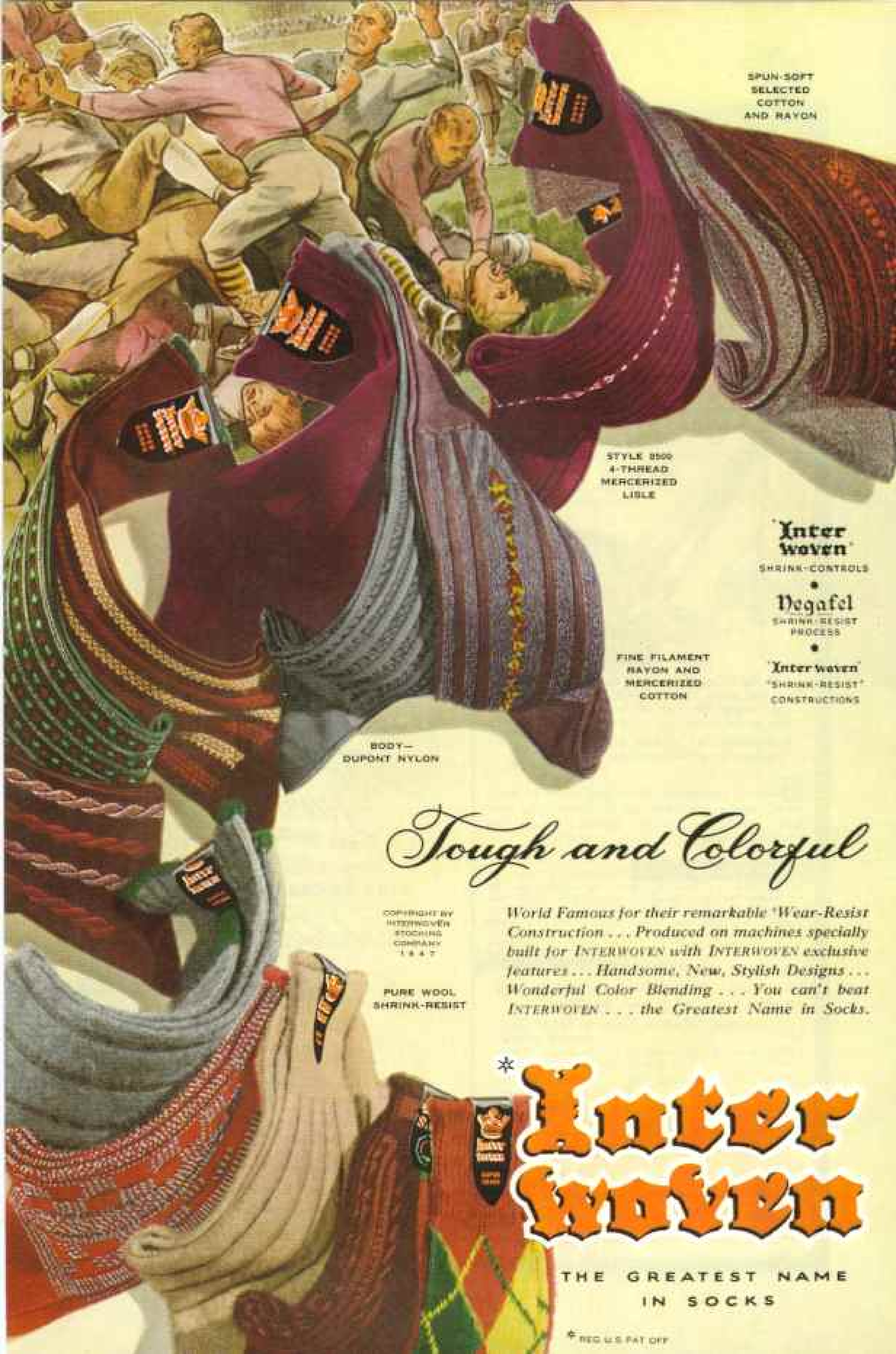
Over the last 25 years—and that includes the war years—the railroads have earned an average of only 3⅓% annually on their net investment.

Most people think 6% would be no more than fair.

And 6% is the minimum the railroads need to continue to provide the kind of transportation you want.

Association of American Railroads

WASHINGTON 6, D. C.


SPUN-SOFT SELECTED COTTON AND RAYON
STYLE 2500 4-THREAD MERCERIZED LISLE
FINE FILAMENT RAYON AND MERCERIZED COTTON
BODY— DUPONT NYLON
PURE WOOL SHRINK-RESIST

'Inter woven' SHRINK-CONTROLS
•
Negafel SHRINK-RESIST PROCESS
•
'Inter woven' "SHRINK-RESIST" CONSTRUCTIONS

Tough and Colorful

COPYRIGHT BY
INTERWOVEN
STOCKING
COMPANY
1947

World Famous for their remarkable 'Wear-Resist Construction . . . Produced on machines specially built for INTERWOVEN *with* INTERWOVEN *exclusive features . . . Handsome, New, Stylish Designs . . . Wonderful Color Blending . . . You can't beat* INTERWOVEN *. . . the Greatest Name in Socks.*

*Inter woven

THE GREATEST NAME
IN SOCKS

* REG. U.S. PAT. OFF.

"I'M JACK DOUGLAS . . .

the fellow you didn't expect to see here . . . I make Sturdybird Toys specially for the youngsters who 'have everything'. . . . except the thrill of the unusual at Christmas. They're real miniatures and good . . . like big equipment. Sturdybirds challenge the skill and imagination of alert boys and girls . . . and their big folks, too, indoors and out! They're even more fun on a rainy day than out in the yard".

STURDYBIRD CRANE

works like the big cranes!

Husky grab bucket closes with powerful action . . . dumps with a pull on the trip line. Boom hoists and lowers and hoist drum's complete with clutches. Cab swivels. Runs on wide rubber treads. Honest-to-goodness welded steel takes all rough play kids can give! A big heavy job 31 inches long in bright play colors.

$8.50
express prepaid

And the **STURDYBIRD ELECTRO-MAGNETIC HOIST.** Big and strong like the Crane. With battery powered magnet that lifts 10 lbs. Drops load at a flick of the switch .... $10.00 expr. prep.

A MATCHED SET of both Sturdybirds solves the "brother-who-has-to-have-one-too" problem.

Send in coupon for hours and hours of busy, quiet, happy playtimes for that youngster you love. With Sturdybirds, Christmas lasts the whole year long!

P.S. TO BUSY EXECUTIVES: "To remember your customers' kids at Christmas, send them Sturdybirds! On all orders for one dozen or more, I'll stencil your Company's name on the toys where it won't be overlooked! I'll take the whole problem off your hands and ship to your customers' homes. How's that for a hint?"

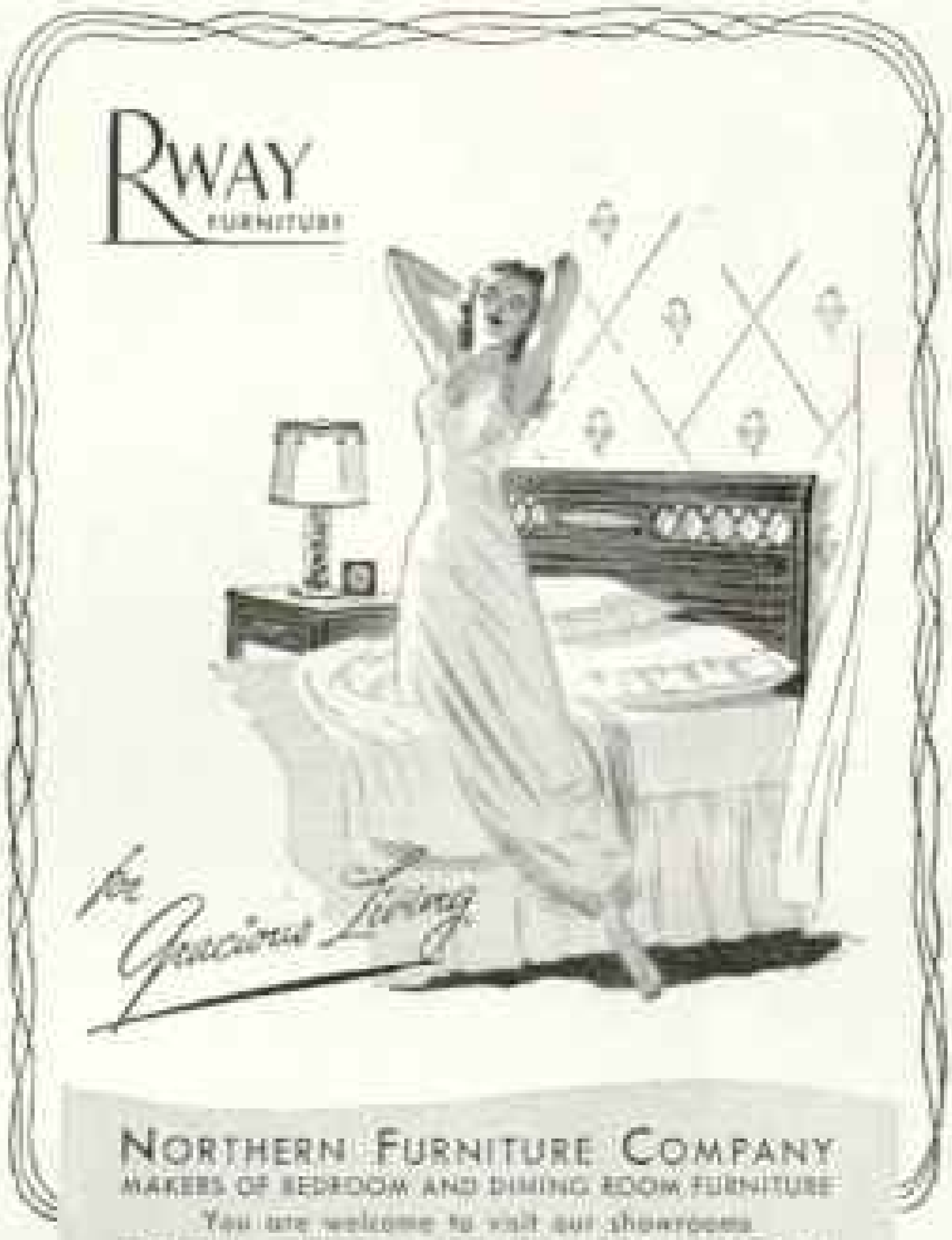
Jack Douglas, TECH-ART, INC., MILFORD 10, OHIO
Here's my order for Christmas Sturdybirds........

☐ (Quantity) Sturdybird Cranes at $8.50 each, express prepaid;
☐ (Quantity) Sturdybird Electro-Magnetic Hoists at $10.00 each, express prepaid;
☐ (Quantity) Matched Sets of both Sturdybirds at $18.50, express prepaid.

(Ohio residents only add 3% Ohio Sales Tax)

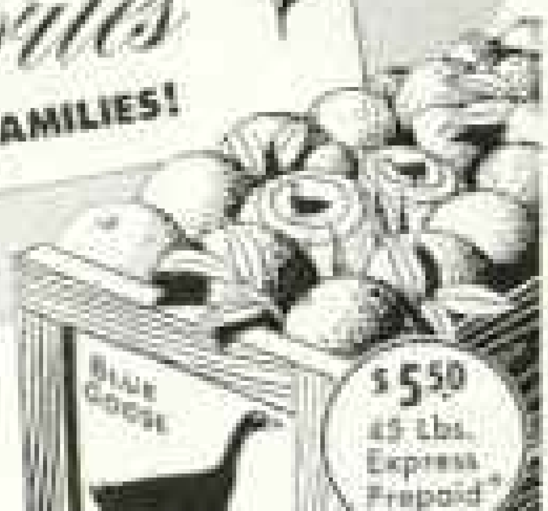
I'm attaching my check for $__________
☐ Ship to me. ☐ Ship to attached list.

NAME__________
COMPANY__________
ADDRESS__________
CITY__________ STATE__________



NORTHERN FURNITURE COMPANY
MAKERS OF BEDROOM AND DINING ROOM FURNITURE
You are welcome to visit our showrooms
BOSTON • CHICAGO • CINCINNATI • CLEVELAND
DALLAS • DETROIT • KANSAS CITY • MILWAUKEE
MINNEAPOLIS • NEW YORK • PHILADELPHIA
PITTSBURGH • ST. LOUIS • SHEBOYGAN
Sold through authorized dealers only.

FOR YOUR GIFT LIST
Favorites
AND THEIR FAMILIES!



BLUE GOOSE

Fabulous Fruit

FROM FLORIDA

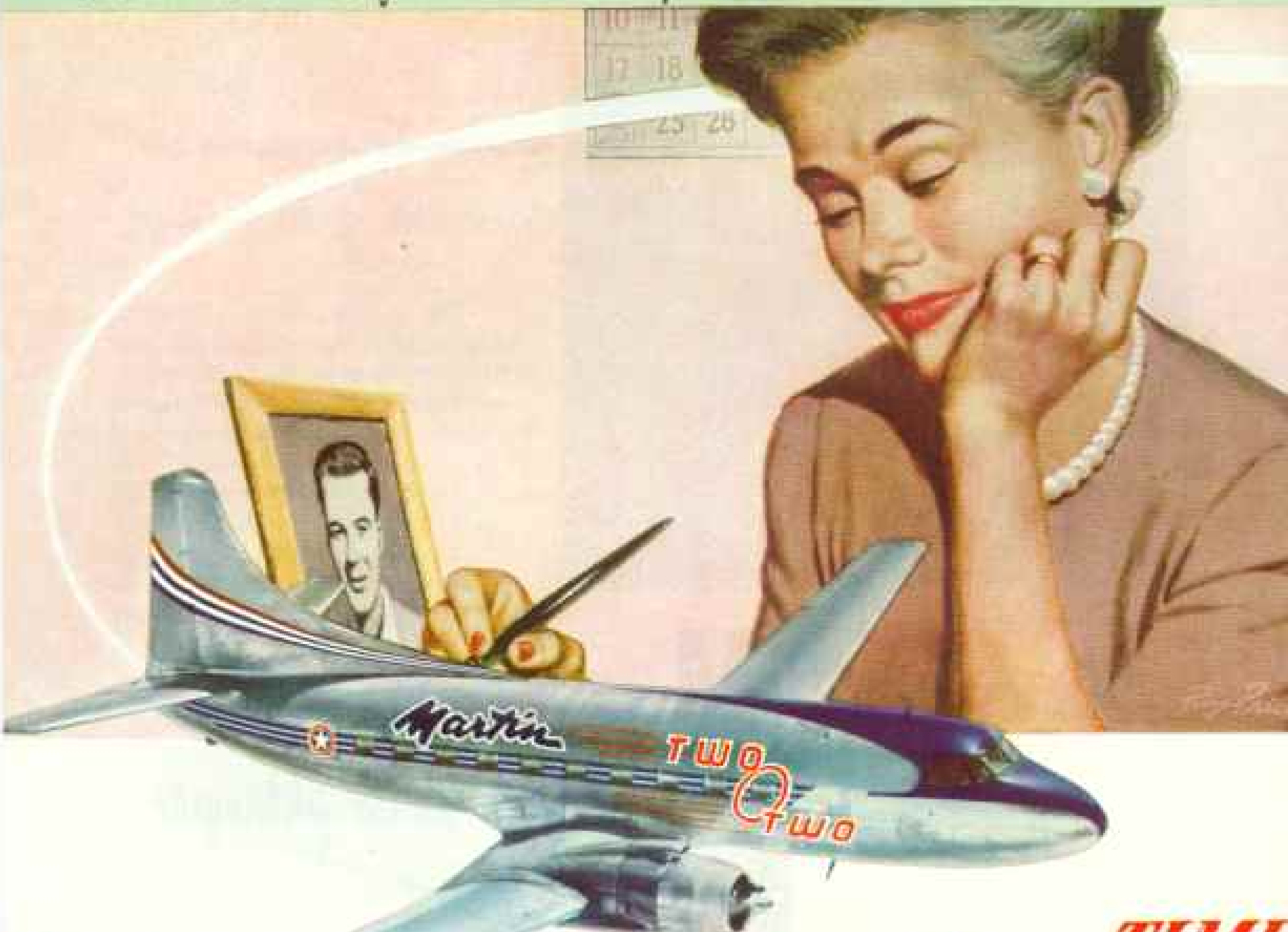
You connoisseurs of customer good will need no introduction to the magnificent gift quality oranges and grapefruit grown in Florida's famous Indian River country. Blue Goose gift fruit is the cream of the Indian River crop, selected from thousands of carloads by the nation's largest marketer of premium fruits and vegetables. Available from December through May. 90 lb. box $10. 45 lb. box $5.50. (Specify oranges, grapefruit, or mixed.) 17 lb. box (oranges or grapefruit only) $3.25.

Perfect condition on arrival guaranteed. Send for free booklet.
*For points West of Mississippi add 10¢.

Air mail, phone or wire order—today.
We must receive Xmas orders by December 1.

AMERICAN FRUIT GROWERS INC.
Gift Fruit Division • 922 21st Street
Vera Beach, Florida

"... come home for the Holiday – but would there be time?"



Yes! THE AIRLINES GAIN YOU *Time..Time..TIME!*

DISTANCE is no longer a barrier between you and those you love. Thanks to the airlines you can get there and back in hours instead of days. When you travel by air, you have more time to spend with friends or family, extra time for profit or pleasure, ample time for a real vacation. Time . . . that's what the airlines give you. *Time!*

Fly Martin . . . Gain Time!

Time . . . translated into speed . . . is one reason why leading airlines the world over have standardized on Martin transports. For these fast-flying 2-0-2 and 3-0-3 airliners are 100 m.p.h. faster than the twin-engined transports they supplant. They bring high express speeds to *every* airline city . . . offer unsurpassed comfort and dependability. Travel with glamour . . . specify *Martin* airliner . . . save more time!

Proved in Service

A new era of swift, dependable transportation is opening, as the ultramodern Martin 2-0-2 enters service on leading airlines. Meanwhile, Martin is spurring production so that more Americans can fly on these advanced airliners . . . and gain *Time, Time, TIME!*

THE GLENN L. MARTIN CO., BALTIMORE 3, MD.

An International Institution

Manufacturers of: Advanced military aircraft • Aerial gun turrets • Guided missiles • Outstanding commercial planes for both passenger and cargo service • Marvinol resins (Martin Plastics and Chemicals Division) **Developers of:** Rotary wing aircraft (Martin Rotawings Division) • Mareng fuel tanks (licensed to U. S. Rubber Co.) • Honeycomb construction material (licensed to U. S. Plywood Corp.) • Stratovision aerial broadcasting (in conjunction with Westinghouse Electric Corp.) • Aircraft ground-handling equipment (licensed to Aircraft Mechanics, Inc.) **Leaders in Research** to guard the peace and build better living in many far-reaching fields

Martin

AIRCRAFT

Builders of Dependable Aircraft Since 1909

GET THIS ***FREE*** BOOK

Fill out and mail coupon for your copy of the colorful new Martin Booklet, "HOW TO TRAVEL BY AIR."
The Glenn L. Martin Co., Dept. 180
Baltimore 3, Maryland

Name..

Address...

City.................. Zone.... State.... EG

The Magnavox Provincial . . . in beautiful distressed fruitwood finish, $300.

"Perfect end of a perfect day

. . . music by Magnavox!"

From mountain cabin to suburban mansion, Magnavox fits graciously into every living scheme . . . both as fine music and superb furniture. Magnavox offers every new and improved development of radio science, including unmatched tone quality, genuine static-free Armstrong FM and fully automatic record changing. Look for your dealer's name in the telephone directory. The Magnavox Company, Fort Wayne 4, Indiana.

the magnificent Magnavox *radio-phonograph*

FOR YOUR *Ski Vacation!*

Plan now for your vacation in the clear mountain air and health-giving sunshine of Québec's mountain districts. You will enjoy the old fashion hospitality of Québec's comfortable, modern inns and hotels.

For help in planning your trip, write PROVINCE OF QUÉBEC TOURIST BUREAU, QUÉBEC CITY, CANADA.

Write the Provincial Publicity Bureau, Parliament Bldgs., Québec City, for information concerning the unsurpassed industrial opportunities in our province.

LA PROVINCE DE Québec

HOT SPRINGS NATIONAL PARK, Arkansas

Arlington Hotel and Baths

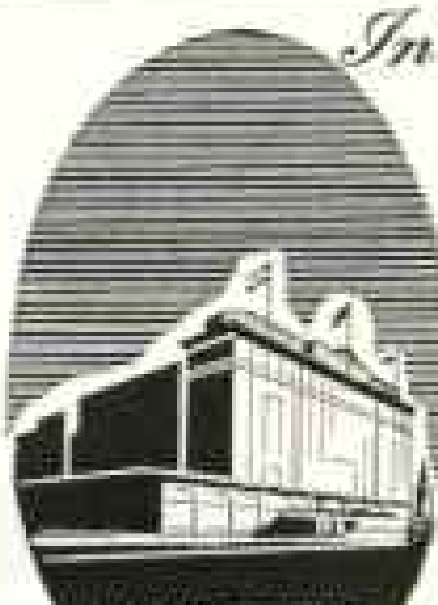
Inviting southern hospitality catering to resort clientele. Complete bathhouse within the hotel for treating arthritis, high blood pressure, nervous exhaustion. Excellent cuisine, social calendar. Good golf, forest bridle trails, racing at Oaklawn track. Through sleepers from Midwest gateways. On U. S. Highway 70. For folder and tariffs, address W. E. CHESTER, *General Manager.*

Only Spa Whose Curative Waters are Owned and Recommended by the U. S. Government

---

In San Francisco...

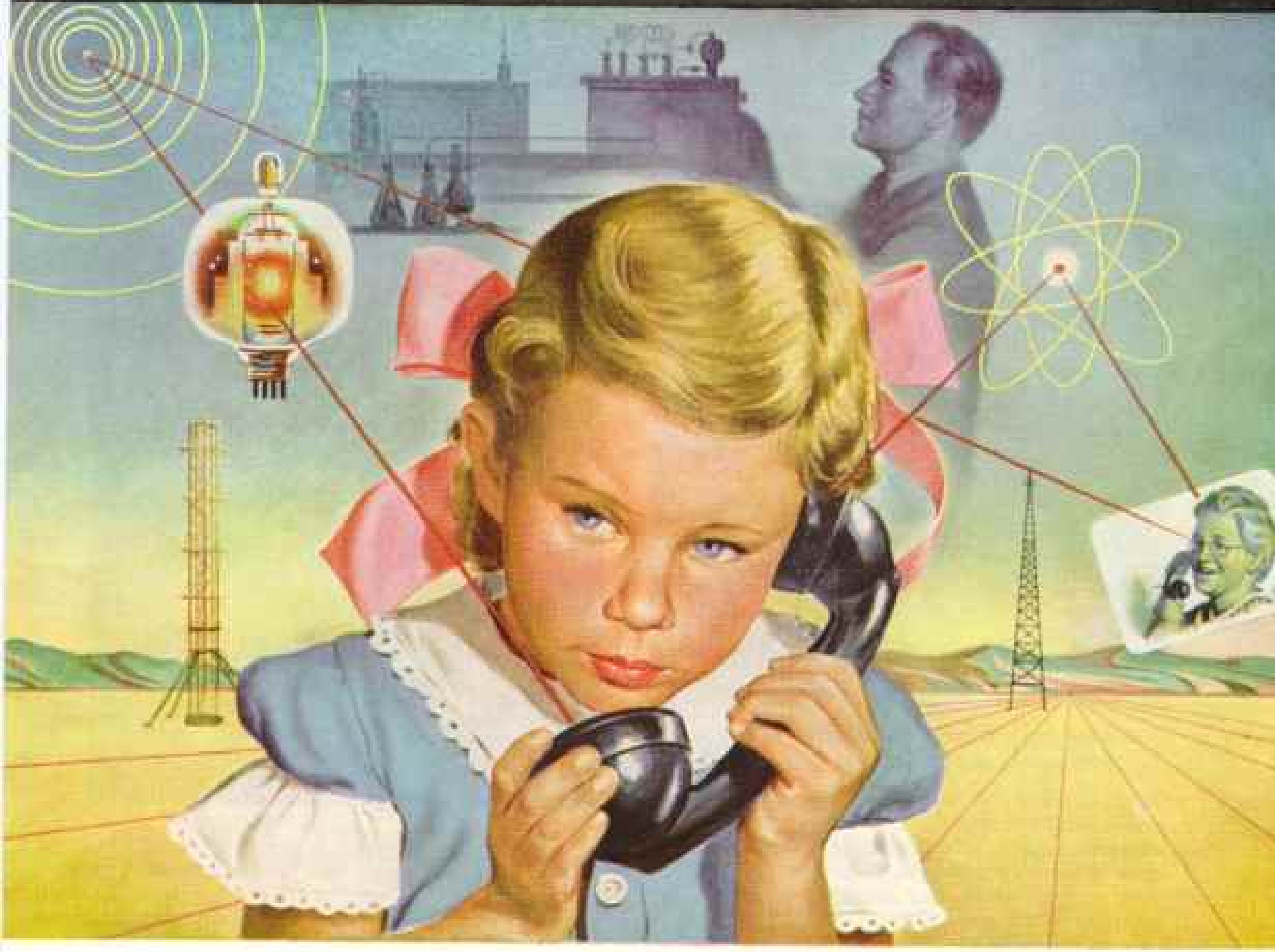
500 Rooms
from $3 - Single
from $5 - Double



you are welcome at the HOTEL WHITCOMB

Karl C. Weber, President & General Manager

"—*mountains are leveled and oceans bounded by the slender force of human beings*"—SAMUEL JOHNSON



Why communications get better all the time

YOUR VOICE girdles the globe in one-seventh of a second.

It travels at 186,000 miles per second—the speed of light—thanks to the telephone and radio. And by television, so do the pictures of any event as it occurs.

What has made this blinding speed possible? What has given us these "ringside seats" . . . to see, to hear, to share in the headline news of the day?

The answer: Greater knowledge of electronic waves and better materials to harness them. For example, the vacuum tube—heart of radio or television—depends upon the greatest possible absence of air or other gases—a high vacuum. Most of the air is pumped out before the tube is sealed. Then a tiny bit of barium, called a "*barium getter*" is flashed inside of it by electricity. This captures the remaining air and gives a nearly perfect vacuum.

Unending research and engineering have also provided finer plastics for insulation, purer graphite and carbon for electronic devices . . . and a host of other basic materials that help shave the speed of communications to the tiniest splinter of a second.

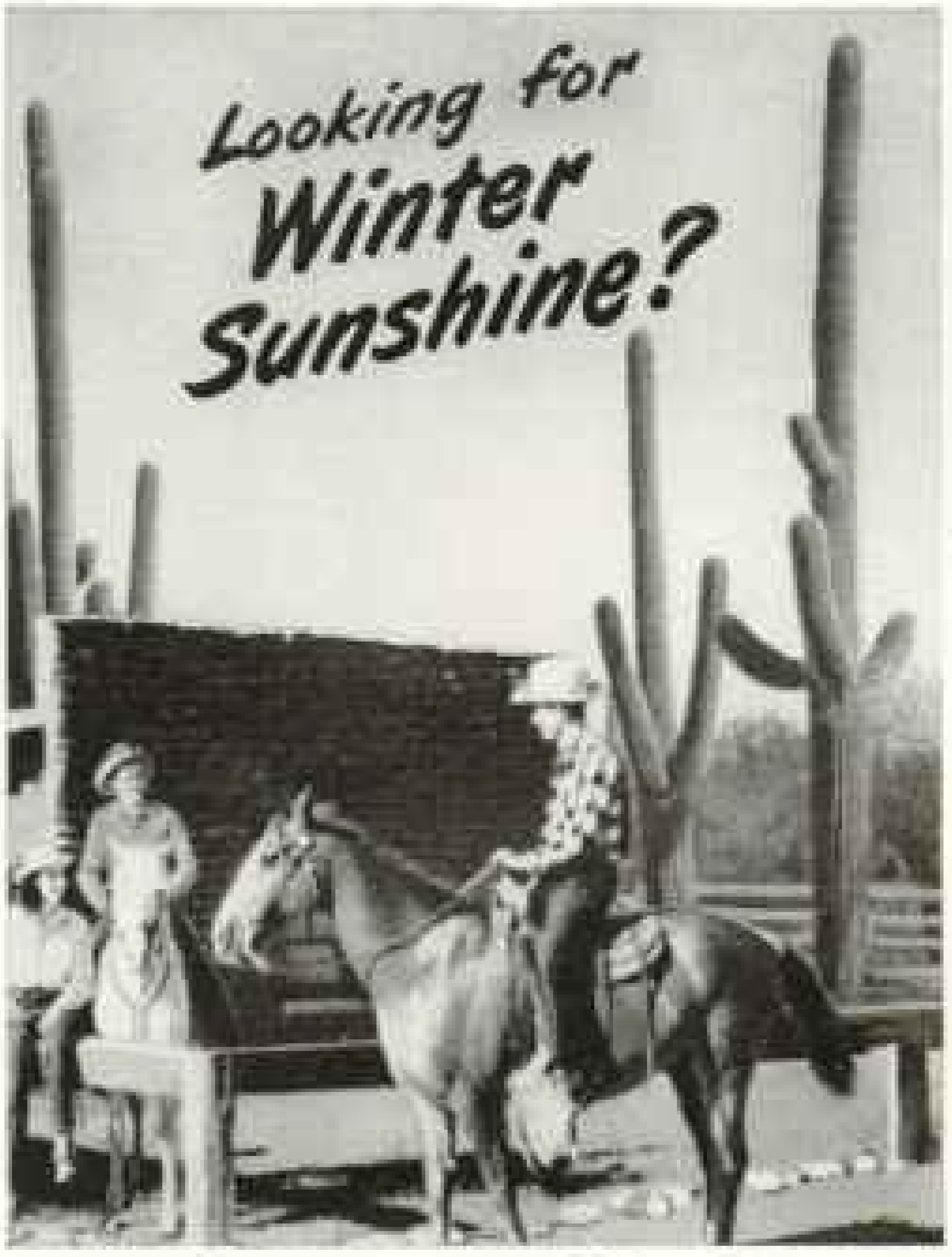
Producing these better materials and many others—for the use of science and industry and the benefit of mankind—is the work of the people of UNION CARBIDE.

FREE: *You are invited to send for the illustrated booklet, "Products and Processes," which describes the ways in which industry uses UCC's Alloys, Carbons, Chemicals, Gases and Plastics.*

UNION CARBIDE
AND CARBON CORPORATION
30 EAST 42ND STREET NEW YORK 17, N.Y.

Products of Divisions and Units include

LINDE OXYGEN • PREST-O-LITE ACETYLENE • PYROFAX GAS • BAKELITE, KRENE, VINYON, AND VINYLITE PLASTICS
KEMET GETTERS • NATIONAL CARBONS • EVEREADY FLASHLIGHTS AND BATTERIES • ACHESON ELECTRODES
PRESTONE AND TREK ANTI-FREEZES • ELECTROMET ALLOYS AND METALS • HAYNES STELLITE ALLOYS • SYNTHETIC ORGANIC CHEMICALS


Looking for Winter Sunshine?

Tucson has more sunshine than any other resort city in America!

Trade galoshes for western boots . . . a snowbound home for a sun-warmed patio. Have a wonderful winter in Tucson, spending fun-filled hours in sunshine unmatched anywhere. Ride, hunt, fish, golf . . . visit national parks, Old Mexico next door . . . or just relax.

Thrill to western life . . . enjoy ranch activities. Stay at a modern hotel or guest ranch. Excellent private schools. Sanatoria. Write for information: Tucson Sunshine Climate Club, 4704-C Rialto, Tucson, Arizona. Reservations are still limited. So please get yours confirmed before coming.

YOUR PLACE IN THE SUN IS

Tucson

IN FRIENDLY ARIZONA

Forstner

KOMFIT

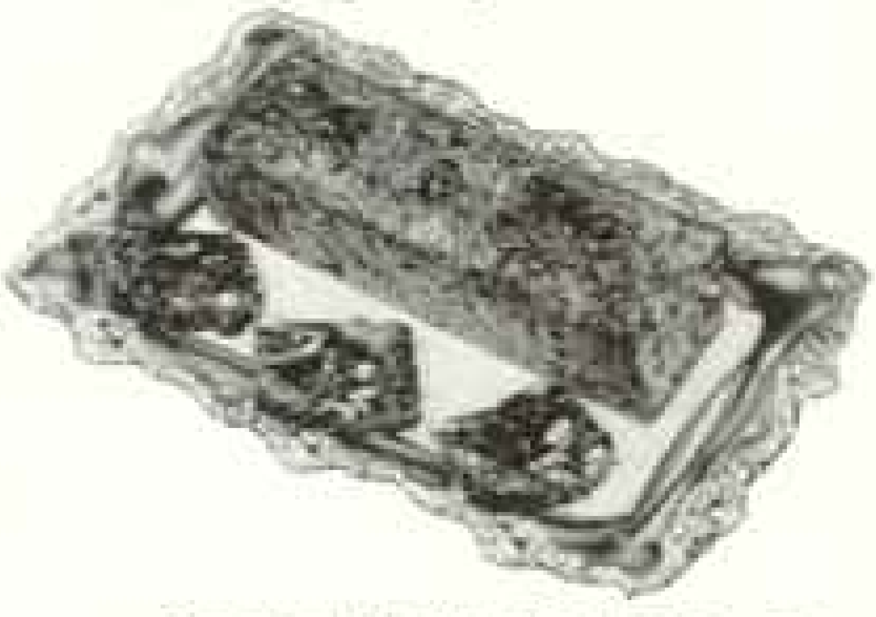
The finest name in watch bands

Thin as a dime
Completely flexible
Adjustable to wrist size
Stainless steel lined

At better stores everywhere
Stainless steel—for white watches $6.00
1/20-14 kt. gold filled—for yellow watches $15.00*
*Federal tax not included

Write for Booklet 84 to Forstner Chain Corporation, Irvington 11, New Jersey, U. S. A.

Serve it Thanksgiving; send it to friends!



HOENSHEL

Brandied **FRUIT CAKE**

Richly dark, crowded with glacéd fruit and choice nuts, mellowed by rare brandy and fine wines. Distinguished for fruit, fragrance and flavor. You'll love it. If dealer can't supply you, order direct, but give us his name, please.

1½ lb. cake, $1.79; 3 lb. cake, $3.32; 5 lb. cake, $5.24; 1½ lb. cake with hard sauce, $2.34; 3 lb. cake and Brandied Hard Sauce, $4.32. Prepaid this side of Rocky Mts., beyond add 25¢.

FRUIT PUDDINGS—Plum, Fig, Fig and Date breathe the Christmas spirit. 2 lb. Puddings—$1.65 each

Brandied Hard Sauce
10 oz., 75¢; 28 oz., $2.00

Cinnamon Toast Spread
10 oz., 69¢; 28 oz., $1.75

HOENSHEL FINE FOODS, INC.

1004 Hancock Street • Sandusky, Ohio

Largest Individual Maker of Fruit Cake in the World

This Christmas

ACCURATE TIME . . . *plus*

Universal Genève Chronograph and
Calendar Watches are essentially *fine timepieces*—
with fascinating *extra* features
useful to every business and professional man.
As a stop-watch, the Chronograph
clocks events in 1/5 seconds up to 12 hours.
It measures speed and makes
other automatic calculations.
Calendar models keep you up-to-date to the
second, minute, hour, day, date, month
and even the

phase of the moon.

Leading jewelers everywhere can
show them to you and tell you all about them.

All prices mentioned are for stainless steel, Federal Tax included.
A few models available in 14 Kt. or 18 Kt. gold.
Watches shown smaller than actual size

CALENDAR WATCH
With Moon Phase $95
Without Moon Phase $85

UNI-COMPAX
45 Minute Register $95

COMPAX
12 Hour Register,
from $110

DATO COMPAX
12 Hour Register,
Calendar $125

BUSINESS MAN'S
COMPAX
12 Hour Register
Appointment Dial $135

TRI COMPAX, 12 Hour Register,
Calendar and Moon Phase $155

UNIVERSAL
GENÈVE

Established 1894

The World's Largest Maker of Chronograph and Calendar Watches

Write for Chronograph Booklet

The Henri Stern Watch Agency, Inc.
587 Fifth Avenue, New York 17, N. Y.

COPYRIGHT [illegible], THE HENRI STERN WATCH AGENCY, INC.

A warm-hearted Christmas Gift
Cobbs
FINEST
FLORIDA FRUITS

Gift No. 11

Gift No. 7

There's no nicer way to remember folks at holiday time than by giving COBBS tree-ripe fruits and delicacies from sun-drenched Florida. **Gift No. 11** is a Mexican hamper containing approx. 45 lbs. of oranges, grapefruit, tangerines, kumquats, limes and sugar loaf pineapple—holiday dressed and boxed for safe delivery. **Price, $11.00.** Satisfaction guaranteed. **Gift No. 35,** same as No. 11 except half the size and weight—**$6.50.**

Gift No. 7, approx. 54 lbs. of mixed citrus fruits, sugar loaf pineapple, 1 lb. jar of brandied tropical fruits, jug of orange blossom honey, 1 lb. jar each of citrus marmalade, fruit conserve, and box of chocolate coconut patties. **Price, $15.00.** "Store fruit" never tasted like this! **Gift No. 4,** approx. 54 lbs. of mixed citrus fruit and sugar loaf pineapple—all for **$8.00.** We pay express charges. Orders must be accompanied by check or money order. **Send for free brochure-price list showing other COBBS gift packages in natural color.** We are America's largest Packers, Shippers, and Manufacturers of tropical gift fruits and delicacies. ***We do not ship cold storage fruit!***

Order NOW for Christmas!

COBBS, Box C-9,
Little River, Florida

☐ Enclosed is my check or money order for $.... for gift packages to be shipped to names on attached list. *For Canadian shipments add 10 per cent.*

☐ Please send me your beautifully illustrated brochure-price list

My Name..

St. & No..

City..................................State..........

INDESTRUCTO

You can now get distinctive, newly designed, light weight Indestructo Luggage in a wide range of styles and patterns. See it and make your selection today.

LUGGAGE INDESTRUCTO

Reg. U. S. Patent Office

AT BETTER STORES EVERYWHERE!

INDESTRUCTO TRUNKS & LUGGAGE CO.
511 S. Sangamon St., Chicago 7, Ill.

MIAMI
Hotel

EVERGLADES

Bask in the sunshine on the roof garden 17 floors above beautiful Bayfront Park bordering sparkling, island-dotted Biscayne Bay.
New coffee shop and cocktail lounge.
Ideal downtown location, close to theaters and shops.
The rates are moderate.

FOR RATES OR
RESERVATIONS
WRITE DEPT. G
Leonard K. Thomson
Manager

PONCE de LEON *HAD THE RIGHT IDEA!*

Ponce de Leon, the Spanish explorer, landed on the northeast coast of Florida, at what is now St. Augustine, on Easter Sunday, 434 years ago. Among other things, he was in search of the secret of eternal youth.

Of course, Ponce de Leon didn't find it. But since then millions of people have discovered the next best thing—which is life in the Florida sunshine. More than two million others have traded holidays for homes in Florida, until today it is one of the fastest growing states in the Union!

Most of these Floridians first came to The Sunshine State on vacation. They leisurely enjoyed the climate, the flowers, the fishing and other water sports. They toured the state, visiting famous attractions, historic points of interest, coastal and inland cities. They relaxed on Florida's beaches, and had fun at spectator events. They went home sun-tanned and healthy, and probably said to themselves: "Why enjoy Florida for just a season? Why not benefit by its sunshine and outdoor recreation all year long?"

You can do the same thing. Come down this fall or winter. See ALL of Florida. There may be a sunnier future here for you, too!

LOOK TWICE AT FLORIDA! Remember that Florida is a big state, a growing state—with manifold opportunities for business, industry and agriculture as well as pleasure. As your first step to happier living, mail coupon below for your free copy of new, 48-page booklet in full color. It tells the complete story of Florida, with photographs and text, facts and figures, covering every phase of life in the sun. Whether you are interested in a vacation, home, farm, or location for your plant, send for this booklet today!

COME TO

FLORIDA

THE SUNSHINE STATE

MAIL THIS COUPON TODAY!

State of Florida, 211 Commission Building
Tallahassee, Florida

Please send me new, free, 48-page, full-color booklet: "Florida, The Sunshine State."

*Name*____________________

*Street and No.*____________________

*City*__________ *Zone*____ *State*______

(Please print name and address clearly)

See the World
IN THREE-DIMENSION
FULL-COLOR PICTURES

EDUCATIONAL
ENTERTAINING

Like to be a "world traveler"? View-Master brings you full-color Kodachrome pictures of famous American, Swiss, English, Latin American, and other scenic wonderlands in the authentic realism of Three-Dimension. Other subjects include Fairy Tales, Animals, and Wild Flowers. Over 350 Picture Reels available. Ideal for children, adults, shut-ins. View-Masters are now, *or soon will be*, at better Photographic Shops, Gift Shops, Department Stores in your community.

Calendograph
TIME FROM MONTH TO SECOND
SUNDAY
SATURDAY
20
MAY
In Steel or 14 K. Gold

MOVADO

WINNERS OF 165 OBSERVATORY AWARDS
SOLD AND SERVICED BY LEADING JEWELERS ALL OVER THE WORLD

Copr. 1947 Movado Watch Agency, Inc., 610 Fifth Ave., N. Y.
36 Toronto St., Toronto, Can.

TEMPTING
PRESERVES FROM
OREGON MOUNTAIN MEADOWS
...FOR CHRISTMAS GIVING

No. 2 GIFT BOX. Six asst. 3½-oz. jars Whole Strawberry, Oregon Wild Plum, Blackberry, Greengage, Prune with Hazelnuts, and English Gooseberry.
Express Prepaid **$2.95**

Write for Free Catalog

JANE AMHERST 1120 N.E. 47th Ave.
PORTLAND 13, OREGON

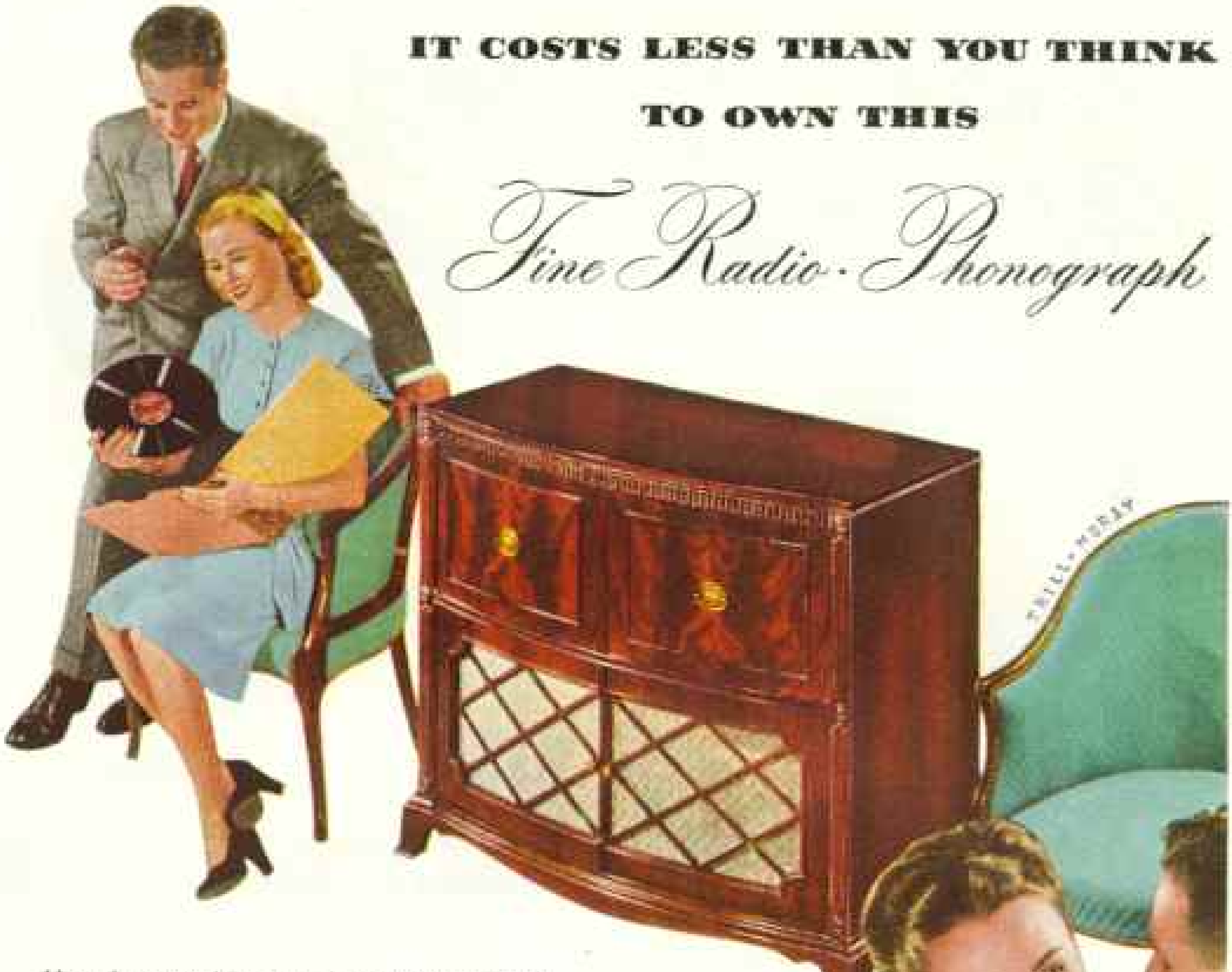
FROM
JANE AMHERST'S
KITCHEN

Electrically Heated

COME TO
FLORIDA
THE SUNSHINE STATE

IT COSTS LESS THAN YOU THINK TO OWN THIS

Fine Radio-Phonograph



Here is everything you have ever wanted in a fine radio-phonograph.

In this magnificent instrument, Westinghouse has engineered performance that you'll have to hear to believe . . . cabinet craftsmanship that you'll have to see to appreciate . . . original radio features that you'll have to examine to realize how much more enjoyment they will bring you.

A visit to your radio retailer will prove to you that here is the instrument you have always wanted at a price lower than you dreamed possible . . **$379.95***

HOME RADIO DIVISION, SUNBURY, PA.

The Westinghouse One Sixty-Six with Plenti-power—the Electronic Feather—Rainbow Tone FM—and AM

Listen . . . and you'll buy

Westinghouse

Tune in Ted Malone Monday through Friday 11:45 A.M. E.S.T., A.B.C. Network

---

*Prices slightly higher Denver and West

The Ideal GIFT

PERSONAL AND USEFUL

200 NOTE SHEETS
100 ENVELOPES
Printed with name and address

$1.00
POSTPAID

This gift—as personal as one's name—will be used and appreciated. Each sheet and envelope printed with name and address. High quality *rag content bond paper.* The favorite stationery of thousands. Satisfaction *guaranteed.* Just send us a list of your friends together with a dollar for each name. Remit with order. (West of Denver, Colo. and outside U. S. A. add 10% to prices.)

ORDER NOW Packages will be mailed to you—promptly, postpaid. We guarantee you will be pleased with this famous stationery.

THE AMERICAN STATIONERY CO.
300 Park Avenue, Peru, Indiana

Deluxe Package Long style sheets (6⅞ x 10½). Heavier-than-average rag content bond paper. 125 note sheets, 125 envelopes, printed with name and address. Postpaid, only **$2.00**

AMERICAN STATIONERY

"THE MUCH FOR A LITTLE"

Makes Exposure Simple and Sure

For sparkling, brilliant pictures, use a WESTON with your still or movie camera. Tells you the correct camera settings to use for any scene. Ideal for black-and-white film . . . a "must" for color. Ask your photographic dealer for a demonstration . . . Weston Electrical Instrument Corp., 584 Frelinghuysen Ave., Newark 5, New Jersey.

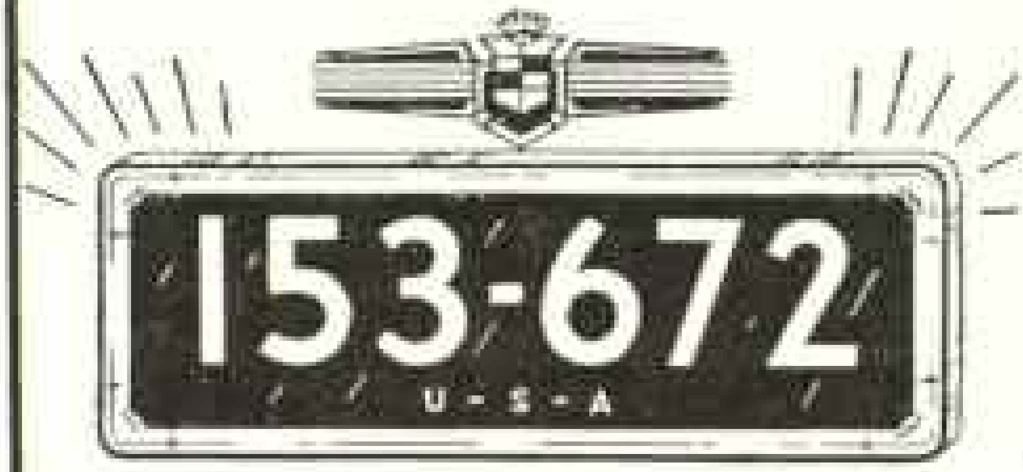
WESTON *Master* II **EXPOSURE METER**

"the meter most photographers use!"

RAYLINE

LICENSE PLATE FRAMES

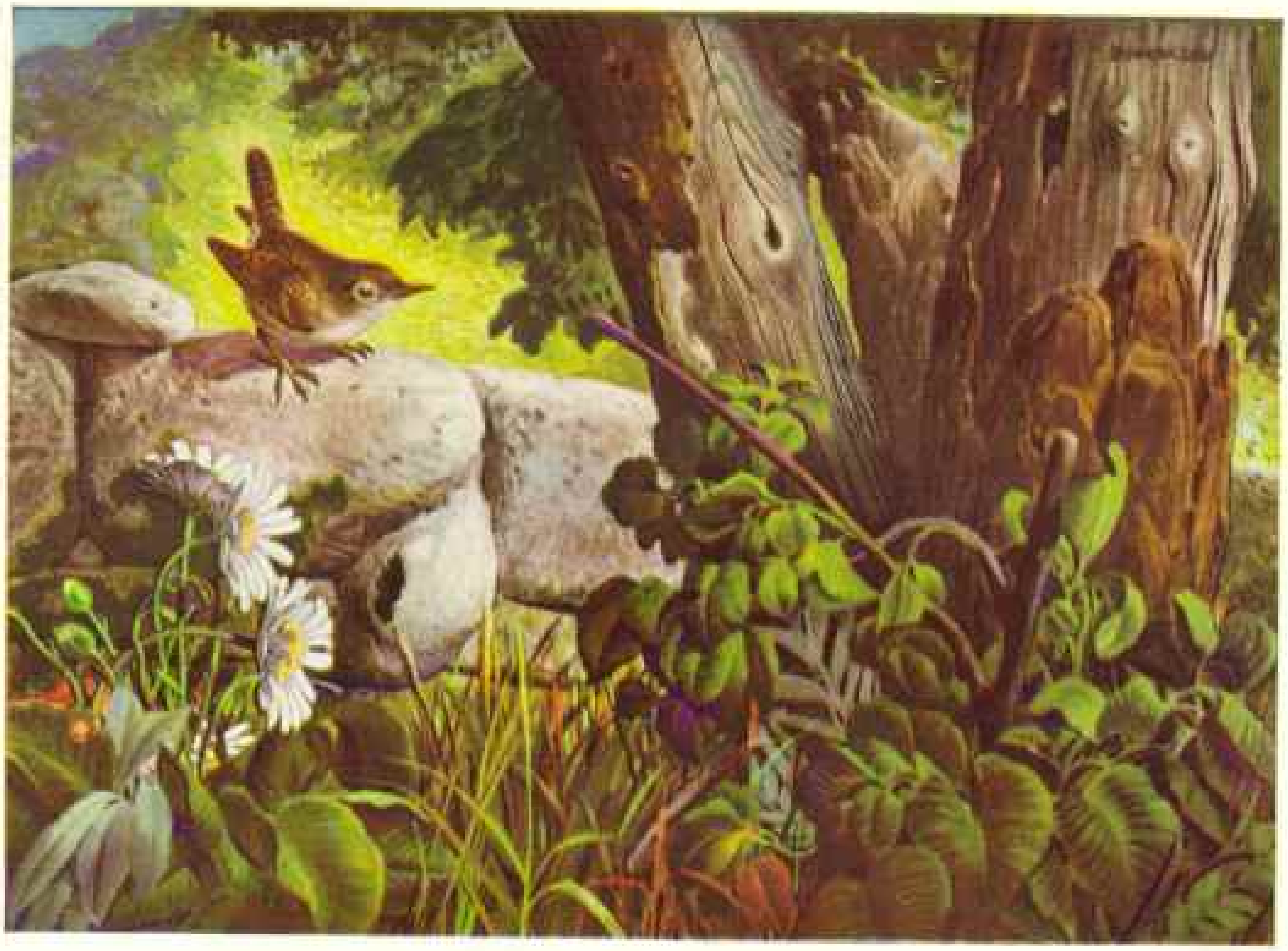
The mark of DISTINCTION for ANY car!



CHROME ON SOLID BRASS
WITH THE WELDED-RUBBER TEMPERED GLASS FRONT

- KEEP LICENSE PLATES CLEAN AND LEGIBLE
- MATCH CHROME TRIM ON NEW CARS
- GLASS IS COMPLETELY CUSHIONED IN LIVE RUBBER
- CARRIES SAME GUARANTEE AS NEW CAR
- THE MOST BEAUTIFUL LICENSE PLATE FRAME MADE
- INSTALLED WHILE YOU WAIT AT YOUR DEALER'S

INTERNATIONAL MFG. CO.
BOSTON, 15, MASS.



Can you find Troglodytes' nest?

THE EUROPEAN WREN (*Troglodytes troglodytes troglodytes*) is a master camouflager. When its nesting spot is an ancient, moss-grown tree trunk, Troglodytes shapes its nest to look like a decaying knot. The bird makes a door in the side to further the illusion and sheathes the nest with the same moss that covers the tree.

Against a haystack, Troglodytes builds a nest with a covering of loose hay. And in a cranny in a lichen-covered wall, its home is camouflaged with lichens. To conceal the nest and keep the fledglings from harm, Troglodytes adapts the building plans to suit the nesting site.

Troglodytes' hidden nest is a good example of the careful measures that most wild things take to keep trouble from coming their way. But man alone, of all living creatures, has realized that safeguards are never quite infallible.

Knowing that he can't depend absolutely on avoiding trouble, man does a very wise thing. He fixes it so that his family will suffer no financial harm when and if his safeguards fail. He invests in insurance, making sure that he has enough of each kind to protect his family fully.

Today, a fire or a burglary or an accident can cost you a great deal more than it would have several years ago. And you naturally need *more* fire, burglary, accident, and liability insurance.

Also, because everything they eat and wear costs more today, your family would be in a tougher spot than ever should they be deprived of your income. So isn't it a good time to consider increasing your life insurance?

Ask your Travelers agent or broker about The Travelers Triple Protection Plan—a way to give your family more life insurance protection at an economical cost. And ask him to check your other policies, too.

NOTE: The lichen-covered nest is in the wall, its entrance directly beneath the bird's eye.

MORAL: INSURE IN

The Travelers

ALL FORMS OF INSURANCE AND SURETY BONDS

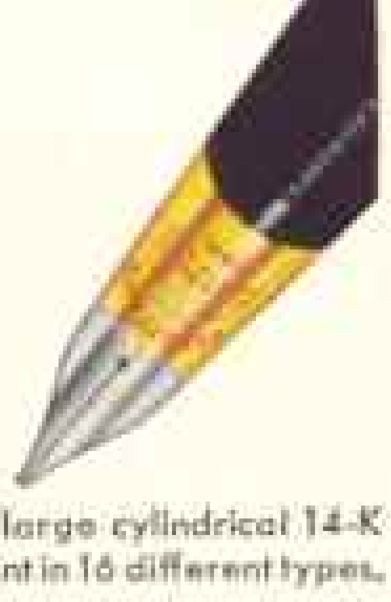
The Travelers Insurance Company, The Travelers Indemnity Company, The Travelers Fire Insurance Company, The Charter Oak Fire Insurance Company, Hartford, Connecticut.

Color Photograph by Léon DeVo

functional beauty for any desk . . .

PERFECT GIFT FOR HOME OR OFFICE!

Available in a wide selection of styles, sizes and materials, Sheaffer's "TRIUMPH" desk sets are equipped with the famous 14-K gold point in your choice of 16 different types for every style of penmanship. Any comparison of features and quality will quickly convince you that "TRIUMPH" is the set to give — the set to own — with pride!



Famous large cylindrical 14-K gold point in 16 different types.

SHEAFFER'S

Copyright 1947, W. A. Sheaffer Pen Co.

Set Illustrated, Ageless Jet Crystal, $17.50; others from $15.00 up.

LISTEN SUNDAY to SHEAFFER'S PARADE with Eddy Howard — *NBC Network:* 3 P.M. E.S.T.; 2 P.M. C.T.; 1 P.M. M.T.; 12 Noon P.T.
LISTEN SATURDAY to SHEAFFER'S ADVENTURERS CLUB — *CBS Network:* 11:30 A.M. E.S.T.; 10:30 A.M. C.T.; 9:30 A.M. M.T.; 8:30 A.M. P.T.

Double Reward

from Kodachrome Film in your miniature camera

Projection: your projected Kodachrome transparencies are the "show window" of color photography.

Kodak
KODACHROME

Prints: your Kodachrome Prints are the finest examples of full-color printing.

WHAT—no *color* this time of year? Load your miniature camera with Kodachrome Film and look again at the vivid splashes of youngsters' sweaters . . . grownups' sporting togs . . . the crimson and gold of autumn, silhouetted against a blue, blue sky!

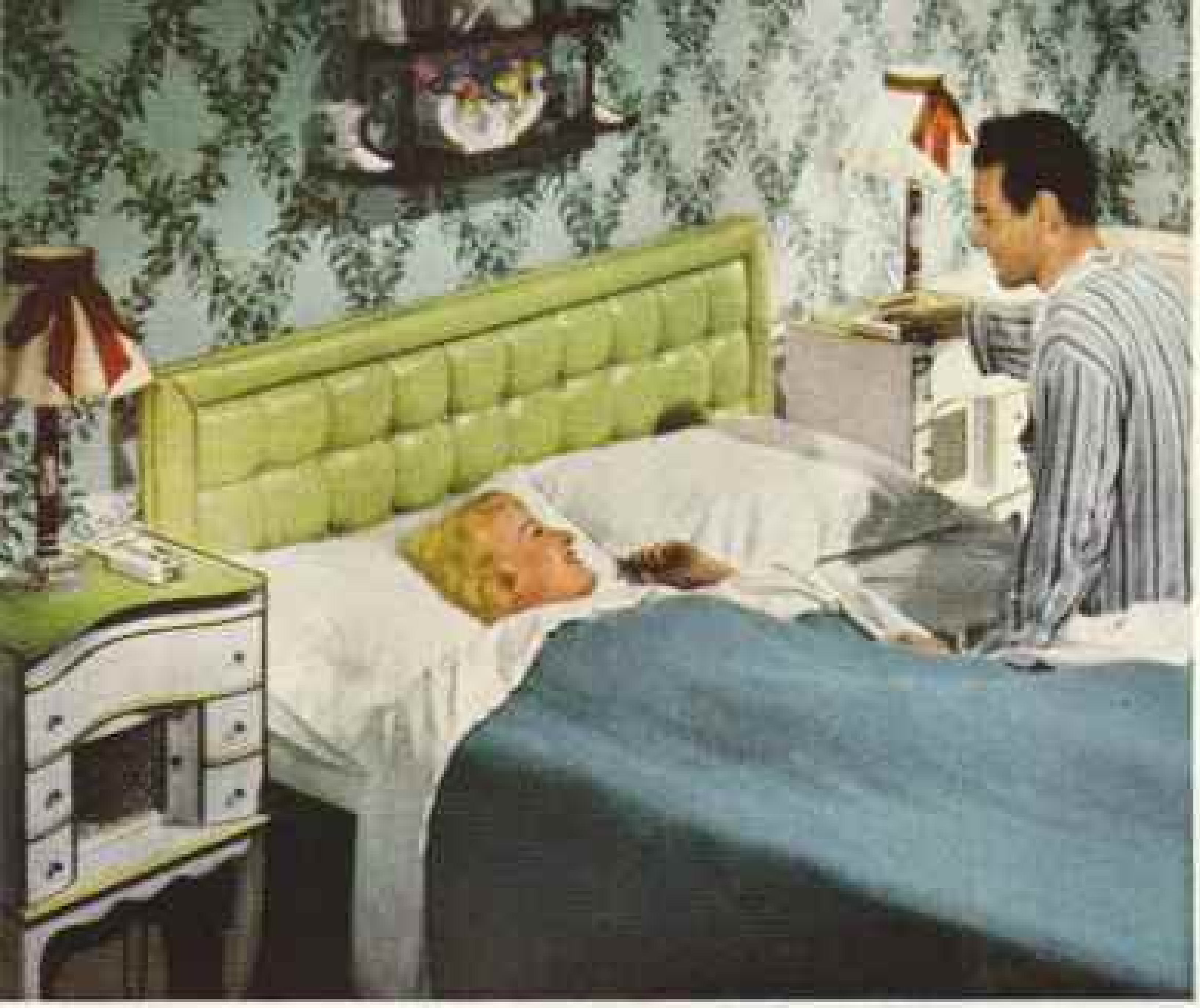
It all comes back to you on your Kodachrome transparencies—your exposed film, finished without charge through your Kodak dealer. Project them on your screen—see the *color!*

And for a double reward, order gorgeous Kodachrome Prints to send around to family and friends—reasonably priced in the new 3X size, shown here actual size. Or you can have larger or smaller sizes.

See your Kodak dealer . . .

EASTMAN KODAK COMPANY
ROCHESTER 4, N. Y.

Kodak

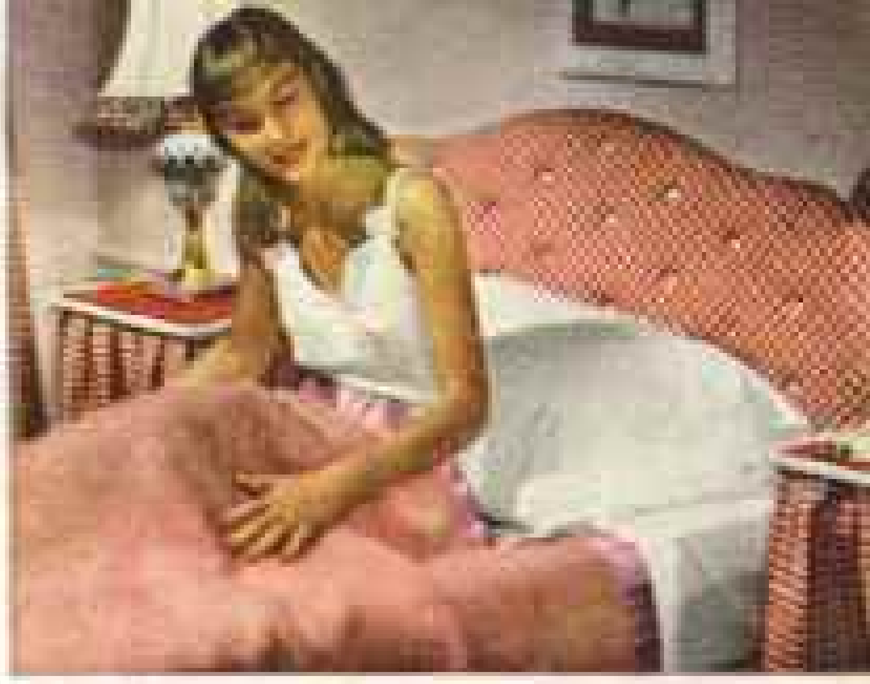


1. **A boon for couples** who like *different* degrees of sleeping warmth—General Electric's *exclusive* Two-Control Blanket! Two controls—one for each half of blanket—function independently. Husband chooses *his* favorite sleeping temperature. Wife chooses *hers*. Both sleep cozily under one cloud-light cover!

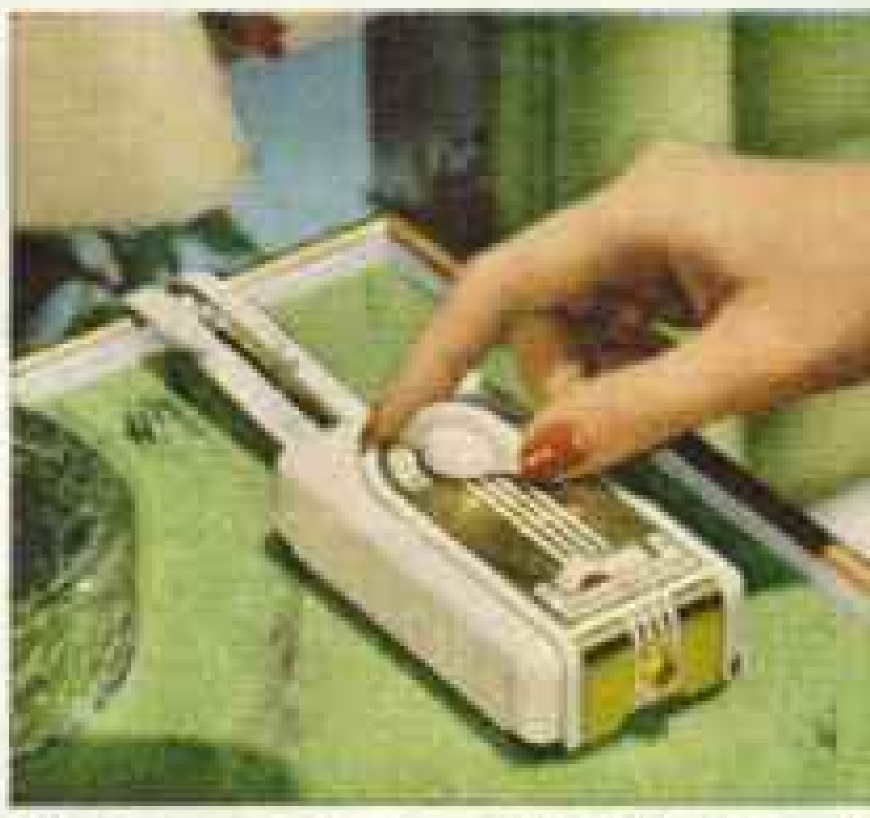
Letters pour in, cheering for General Electric's

AUTOMATIC SLEEPING COMFORT

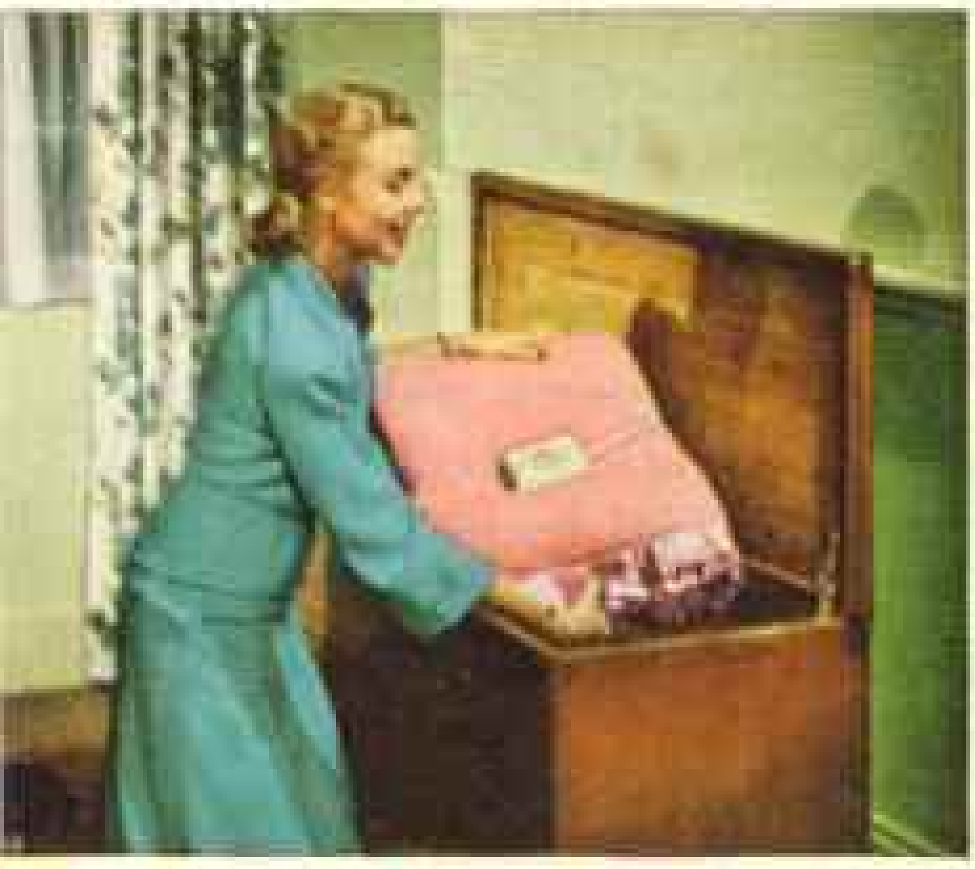
"Wouldn't trade our G-E Automatic Blanket for all the other blankets you'd give us." "Most marvelous night's sleep imaginable" . . . typical comments from more than half a million happy users!



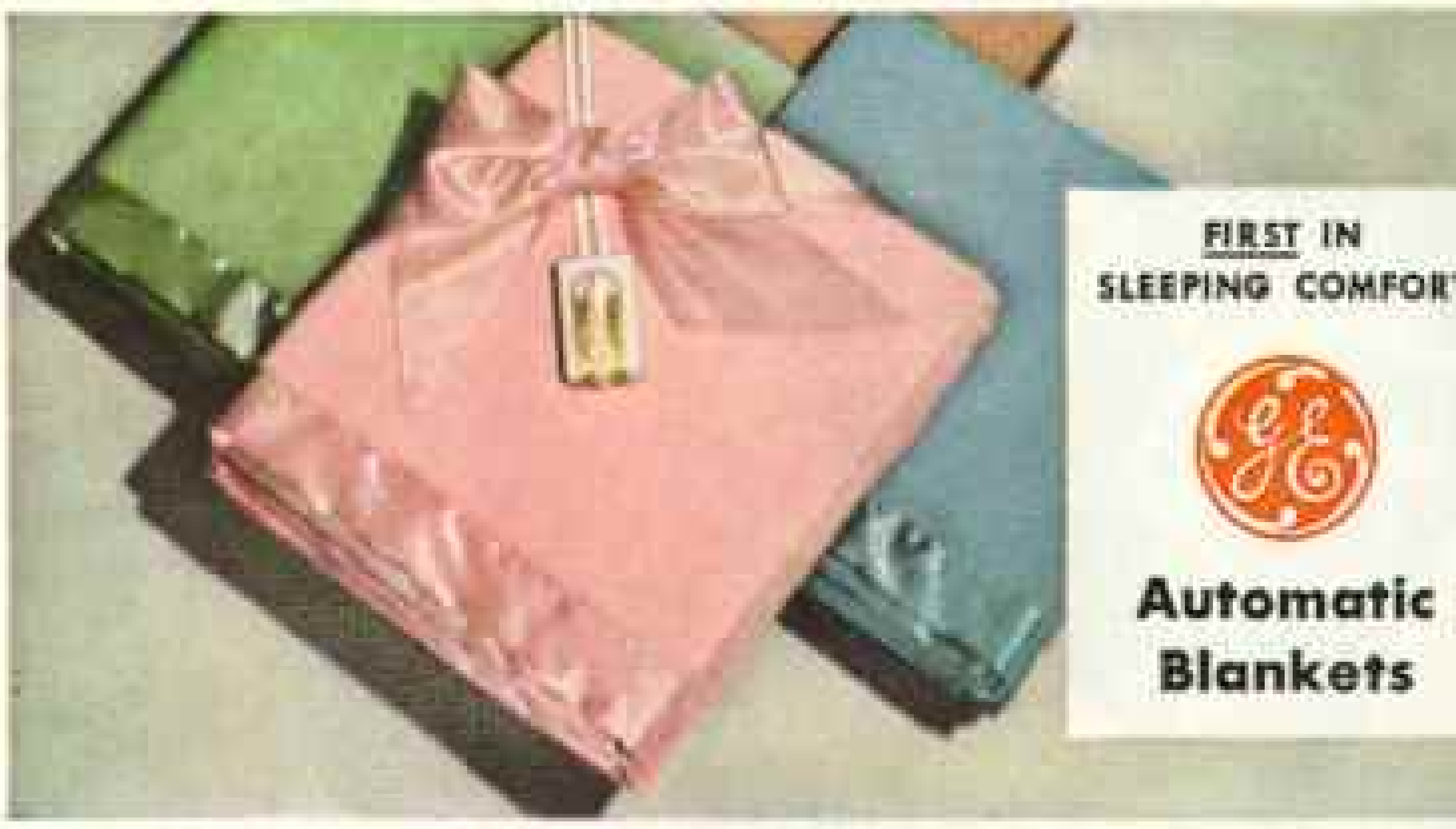
2. **"Wonderful**—the way it prewarms
bed!" That's a frequent compliment
the G-E Automatic Blanket. And it
wonderful! You slip between sunny-w
sheets that stay warm, no matter how
temperature changes outside! (New Tv
Bed size now available.)



3. **Once a season,** set Bed-side Control.
bedtime, just turn it on. *Control autom*
cally keeps you at just-right warmth you
selected. When room temperature dr
Control sends more warmth into blan
—when room temperature rises, Con
sends less warmth.



4. **Savings delight housewives!** A G-E Blanket (about 5 pounds) takes the place of 3 ordinary blankets (about 15 pounds). Saves storage space. Saves buying winter night clothes. Cuts laundry bills. (Launders beautifully—certified washable by American Institute of Laundering.)



5. **All sizes,** in rose, cedar, green, blue. One-Control or Two-Control, 72 x 86 inches (for three-quarter or double bed), $39.95 and $49.95, plus tax. Twin-Bed size 66 x 86 inches, $37.95, plus tax. Department or furniture stores, electric service companies,
your G-E Retailer's, General Ele
Company, Bridgeport 2, Conn.

• • •

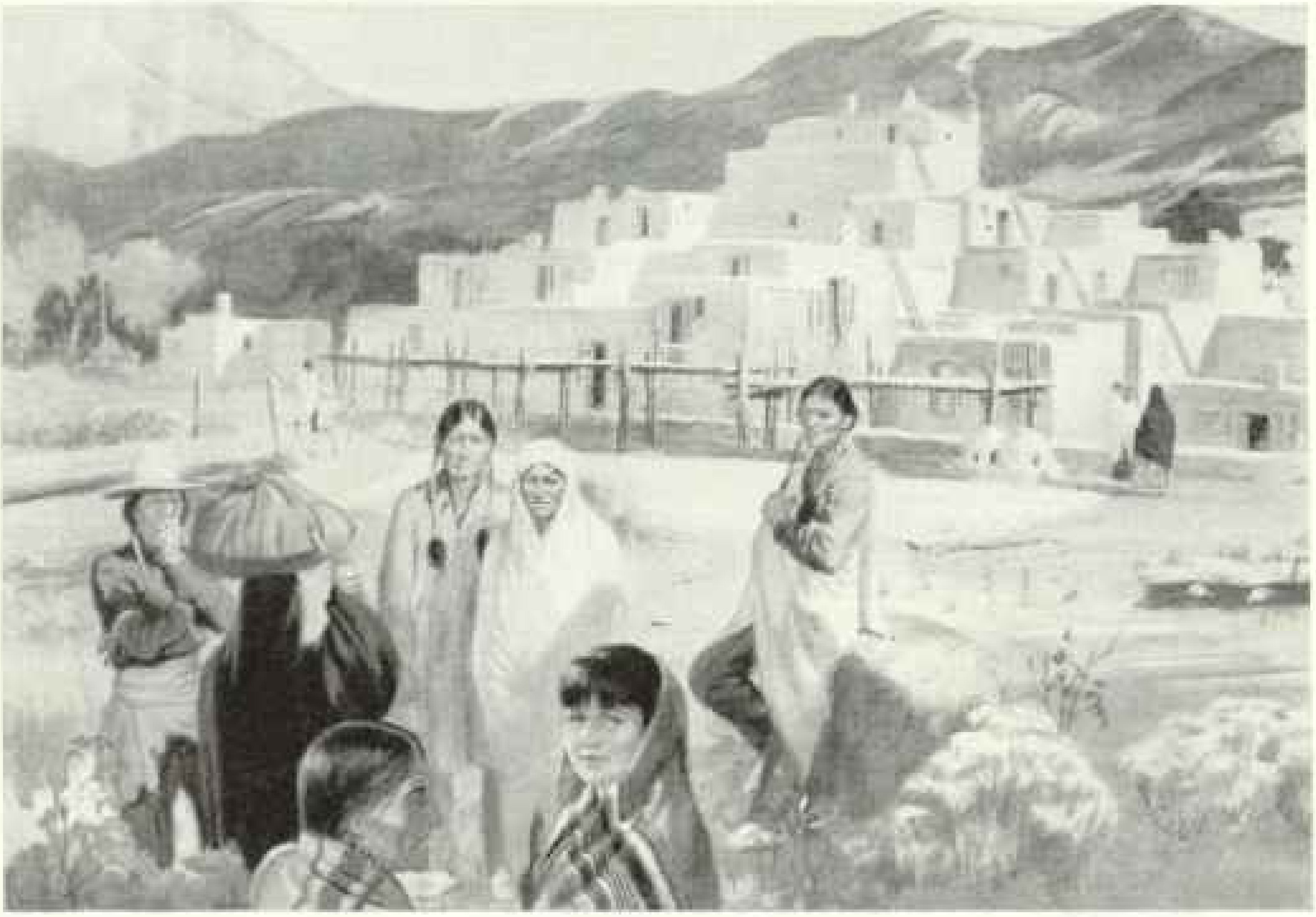
Made to rigid General Ele
safety standards—and approve
Underwriters' Laboratories, Inc.

GENERAL ELECTRIC

Santa Fe

When traveling to or from California on the Santa Fe, visit...

Land of Pueblos



"Taos Pueblo" . . . an age-old Indian pueblo on the Indian-detour trips in northern New Mexico.

No matter when you travel to or from California via the Santa Fe, northern New Mexico calls you to visit its unique and colorful Land of Pueblos.

There, at any season of the year, you see Pueblo Indians in one or more age-old ceremonial dances, visit prehistoric cliff dwellings, ranches, adobe missions, and watch the Indians making pottery and silver-and-turquoise jewelry.

Winter is an especially good time of year to schedule a Land of Pueblos trip. Climate is crisp and invigorating. Nighttimes are memorable, with the air so clear you can almost reach up and "pick a star."

An ideal way to see this Land of Pueblos is on a one, two, or three-day *Indian detour*—the private motor tours that start from Santa Fé, New Mexico.

Convenient, too. Merely arrange to "stop over" at Lamy, New Mexico. A motor coach will meet the train. La Fonda, Fred Harvey's famous hotel facing the historic plaza in old Santa Fé, will be your headquarters.

Let us send you the picture folder giving full details on the colorful *Land of Pueblos* and the *Indian detours*. Just mail the coupon.

T. B. Gallaher, General Passenger Traffic Manager
Dept. NG-2, 80 East Jackson Boulevard, Chicago 4, Illinois

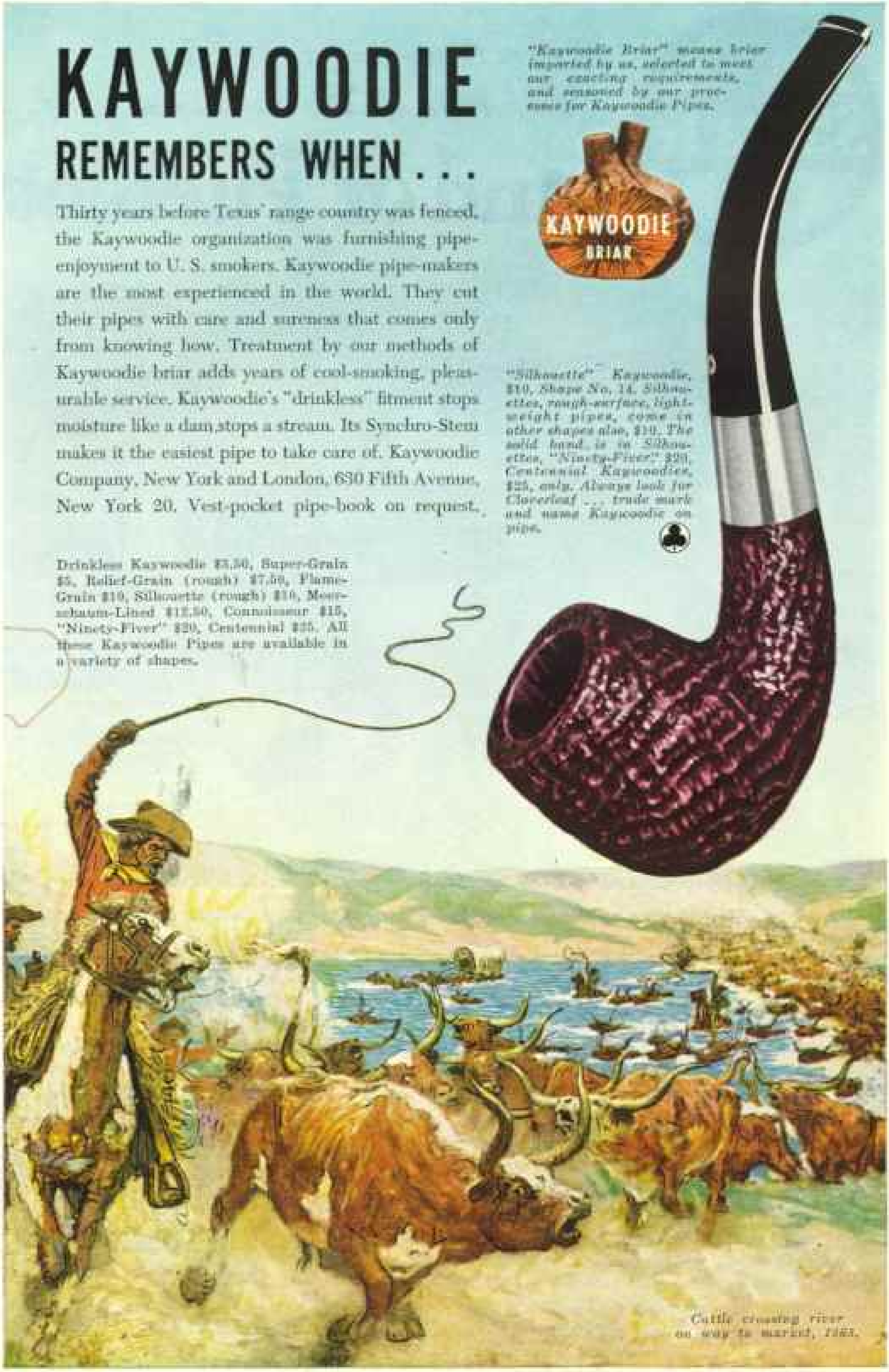
Please send me complete information on the *Land of Pueblos* and tell me how I can explore it on my way to or from California via Santa Fe.

Name ______________________

Address ______________________

City ______________ State ________

SANTA FE SYSTEM LINES . . . Serving the West and Southwest



KAYWOODIE REMEMBERS WHEN . . .

Thirty years before Texas' range country was fenced, the Kaywoodie organization was furnishing pipe-enjoyment to U. S. smokers. Kaywoodie pipe-makers are the most experienced in the world. They cut their pipes with care and sureness that comes only from knowing how. Treatment by our methods of Kaywoodie briar adds years of cool-smoking, pleasurable service. Kaywoodie's "drinkless" fitment stops moisture like a dam stops a stream. Its Synchro-Stem makes it the easiest pipe to take care of. Kaywoodie Company, New York and London, 630 Fifth Avenue, New York 20. Vest-pocket pipe-book on request.

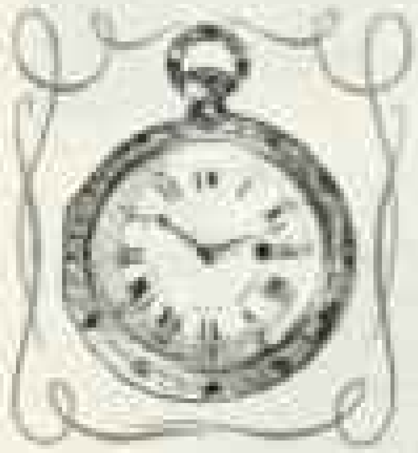
Drinkless Kaywoodie $3.50, Super-Grain $5, Relief-Grain (rough) $7.50, Flame-Grain $10, Silhouette (rough) $10, Meerschaum-Lined $12.50, Connoisseur $15, "Ninety-Fiver" $20, Centennial $25. All these Kaywoodie Pipes are available in a variety of shapes.

"Kaywoodie Briar" means briar imported by us, selected to meet our exacting requirements, and seasoned by our processes for Kaywoodie Pipes.

"Silhouette" Kaywoodie, $10, Shape No. 14. Silhouettes, rough-surface, lightweight pipes, come in other shapes also, $10. The solid band is in Silhouettes, "Ninety-Fiver" $20, Centennial Kaywoodies, $25, only. Always look for Cloverleaf . . . trade mark and name Kaywoodie on pipe.

Cattle crossing river on way to market, 1865.

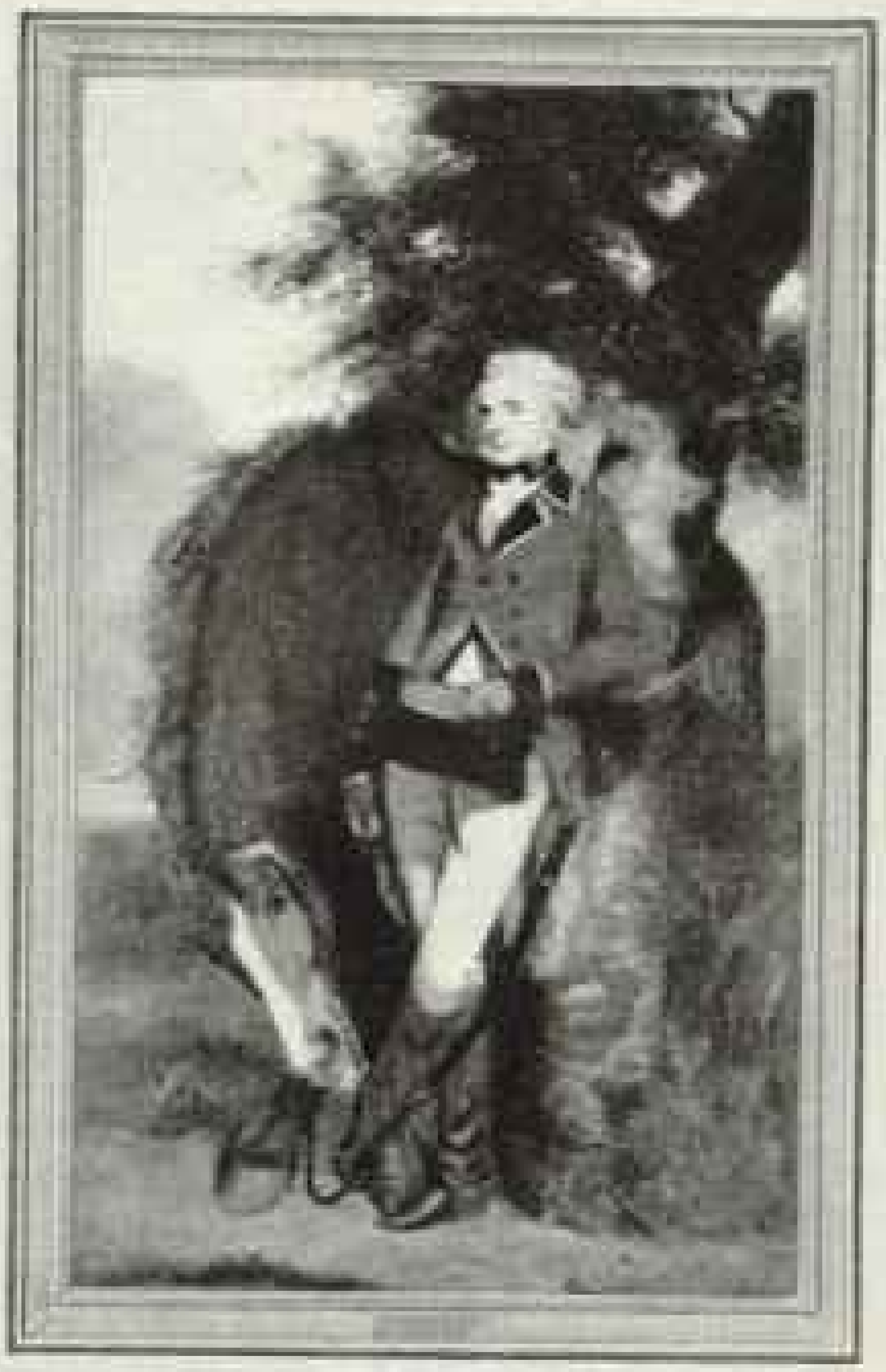
From 18th Century Masters



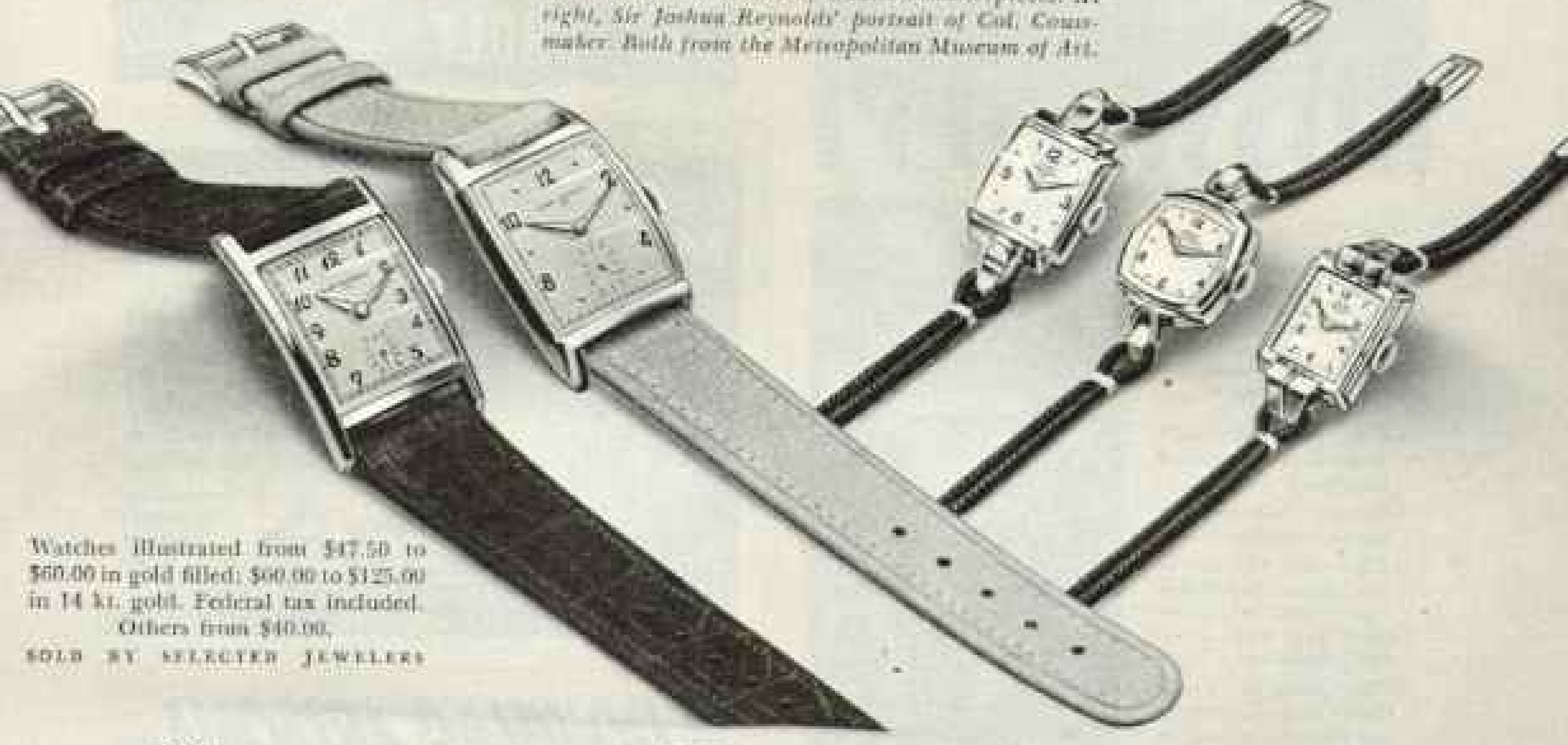
The brilliant career of Sir Joshua Reynolds was drawing to a close in 1791, when on the Continent, another artist, Bautte, completed *his* first masterpiece—a watch of remarkable accuracy and beauty.

This great craftsman, who founded the house of Girard-Perregaux, set up the standard of excellence that was to become its living tradition. Since then, five generations of craftsmen . . . inspired by their rich heritage of achievement . . . have dedicated superlative skills to the science of fine watchmaking.

In their enduring beauty and precision, the timepieces created today by Girard-Perregaux perpetuate the qualities for which this name is renowned throughout the world.



The watch above, one of Bautte's masterpieces. At right, Sir Joshua Reynolds' portrait of Col. Coussmaker. Both from the Metropolitan Museum of Art.



Watches illustrated from $47.50 to $60.00 in gold filled; $60.00 to $125.00 in 14 kt. gold. Federal tax included. Others from $40.00.

SOLD BY SELECTED JEWELERS

GIRARD PERREGAUX

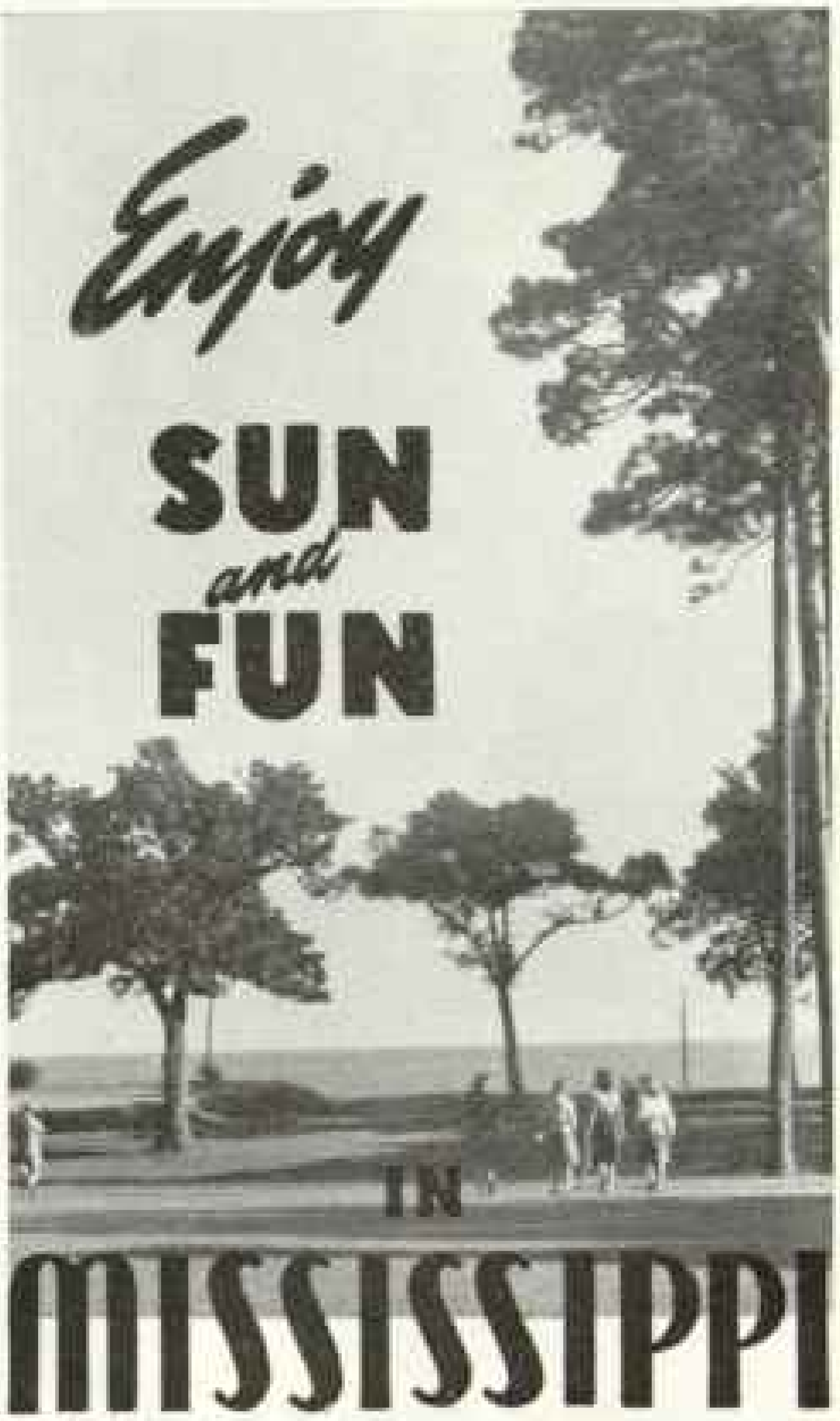
Fine Watches since 1791

Many interesting facts are told about watches in our new booklet. Write for your copy.

Girard-Perregaux Watches, 30 Rockefeller Plaza, New York 20

In Canada: Hamilton, Ontario

Girard-Perregaux Reg. U. S. Pat. Off.



Plan NOW to spend your Fall and Winter vacation in the Magnolia State. Pleasant, sunny days insure restful outdoor fun or quiet relaxation. If you've visited Mississippi, you know the welcome is genuine. If this is your first trip, let us invite you to:

- Ride over America's newest and smoothest highways.
- Enjoy excellent hunting and fishing.
- Visit any and all of the nine beautiful State Parks, which afford year-round accommodations.
- Play along the scenic Gulf Coast . . . go deep-sea fishing, sailing, or golfing.

Travel Department
Mississippi Agricultural & Industrial Board NG 11-47
New Capitol Building
Jackson, Mississippi

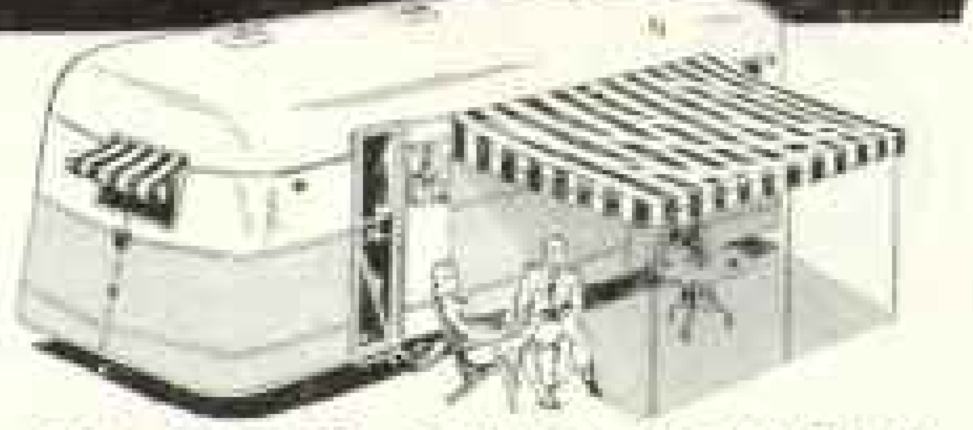
☐ Suggested Tour ☐ State & National Parks
☐ Garden Pilgrimages ☐ Gulf Coast

Name____________________

Address____________________

City__________ State__________

Travel Living
WITH ECONOMY



. . . IN YOUR OWN SCHULT

Today's outstanding VALUE in privacy, amazing convenience, and year-'round comfort for living or luxurious travel . . . A quality product, famed for satisfaction and backed by over a decade of performance. See your Schult dealer, or write today. SCHULT CORPORATION, Dept. 1111, Elkhart, Indiana. In Canada: John Inglis Co., Ltd., Toronto.

* *

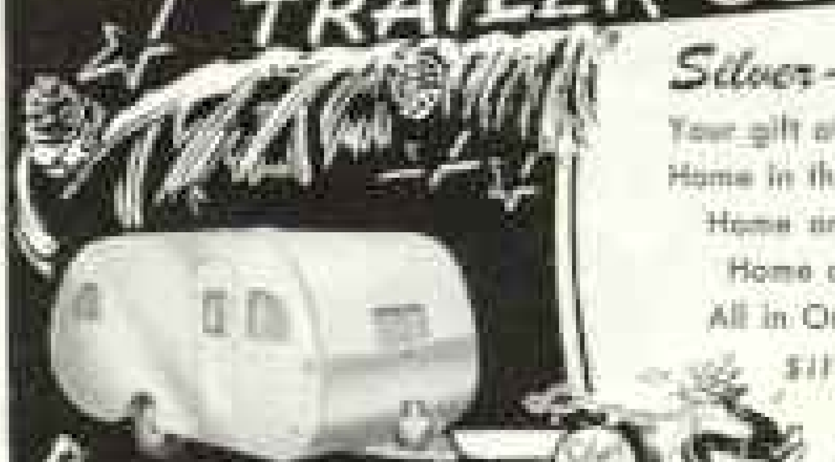
Free Write now for book on trailer coach living and latest Schult easy-trailing models.

Attend National Trailer Coach Show, Phila.
November 8-15, 1947

SCHULT *Trailer Coaches*

Best Gift for All!

MAIN+LINE TRAILER COACH



Silver-Lodger

Your gift of a
Home in the Mountains
Home on the Desert
Home at the Beach
All in One Package!

Silver-Lodger
18', Sleeps 4
fob L.A.
$1345

Write
Dept. G

Main-Line Trailer Coach Co.
8825 AVALON, LOS ANGELES 3, CALIFORNIA

---

it's DOUGLAS, ARIZONA *for more fun in the sun this winter!*

Douglas is gloriously warm, dry, sunny all winter. Loaf luxuriously, enjoy healthful outdoor fun. Here are perfect vacation climate, majestic scenery, historic spots, Mexico just across the street. A modern city, friendly guest ranches offer every accommodation. Write for folder.

it's FREE

DOUGLAS CLIMATE CLUB
543 TENTH STREET DOUGLAS, ARIZONA

SEE MORE..
STAY LONGER

the Easy Restful Trailer Coach Way!

WHAT A THRILL—having your OWN comfortable living quarters, engineered for easy trailering anywhere you want to go—mountains, woods or seashore. Think of the privacy . . . the freedom . . . the economy of this smart way of "traveliving" being chosen by so many thousands of nice people. The establishment of good new trailer parks where needed, and the improvement of present parks, are being actively promoted through continuous program by TCMA's Parks Department. For utmost value . . . for years of comfort and satisfaction from a modest investment . . . be sure to get a coach bearing the winged emblem of TCMA. Write today for illustrated booklet on modern trailer coaches and trailer living.

TRAILER COACH MANUFACTURERS ASSOCIATION

DEPT. 1119, CIVIC OPERA BUILDING, CHICAGO 6, ILL.

The bedrooms of coaches built by TCMA members have real beds, cross-ventilation, built-in closets.

Buy Your Trailer Coach From a TCMA Member

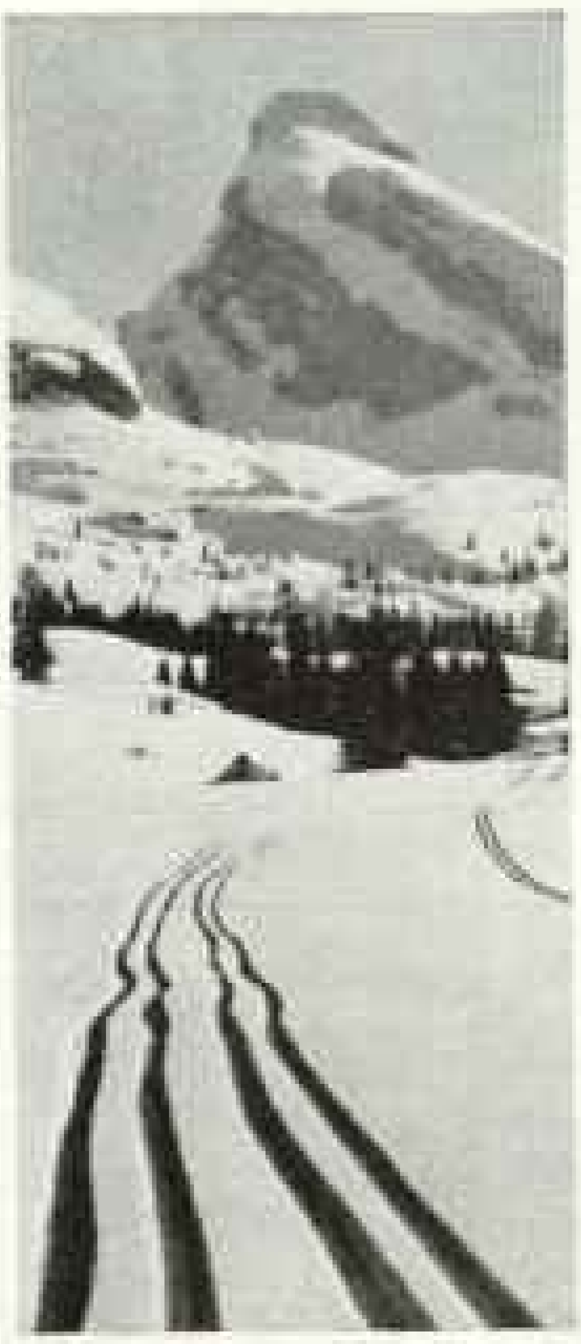
ADAMS • AMERICAN • COLUMBIA
CONTINENTAL • CONWAY • DREXLER • DUO
ELCAR • GENERAL • GLIDER • HOWARD
HOOSIER-RAMBLER • INDIAN • IRONWOOD
KIT • LA SALLE • LIBERTY • LUXOR
LIGHTHOUSE • MACOMB • MAIN-LINE
MODERN • NATIONAL • PALACE
PAN AMERICAN • PLATT • ROYCRAFT
PRAIRIE-SCHOONER • SCHULT • SPORTSMAN
STEWART • STREAMLITE • TRAVELITE
TRAVELO • TROTWOOD • UNIVERSAL
VAGABOND • WALCO • WHITLEY • ZIMMER

Beautiful Bay Palms Trailer Park at the beach near St. Petersburg, Fla.

Write..

For colorful free booklet on latest trailer coaches and the joys of trailering.

ATTEND! 1948 NATIONAL TRAILER COACH SHOW • CONVENTION HALL, PHILADELPHIA • NOVEMBER 8-15
(Except Sunday)



Toggenburg region

SWITZERLAND...
Winter Olympic
Season!

There's a carnival winter ahead in Switzerland's sunny alpine resorts. All winter centers offer superb skiing (with Swiss Ski School instruction), and excellent hotel accommodations at moderate prices. And of course, Switzerland is ideal for spring and summer holidays, too! Plan your trip as far in advance as possible with your travel agent. Write us for free booklet E-4.

1948 WINTER
OLYMPIC GAMES
St. Moritz
Jan. 30 - Feb. 8

NEW YORK:
475 FIFTH AVENUE
SAN FRANCISCO:
661 MARKET STREET

SWISS NATIONAL TOURIST OFFICE

$315.00
Fed. Tax Inc.
AT BETTER
JEWELERS

ATMOS
THE PERPETUAL MOTION CLOCK
MADE BY LECOULTRE

Place Atmos on your mantel and unlock its balance wheel, and it will run indefinitely without hand-winding or electricity—for Atmos is powered by variations in the temperature of the air alone! This miracle of perpetual motion is an achievement of LeCoultre, famous century-old manufacturer of fine watches and clocks.

VACHERON & CONSTANTIN - LE COULTRE WATCHES, INC.
580 Fifth Ave., New York 19, N. Y. Folder on request.

Your Pictures "Come to Life"
on a DA-LITE Screen!

Illustrated: New Da-Lite Challenger, universal favorite for movies, slides, film strips in homes, industry, schools.

Make memories *live again* on Da-Lite's super-reflective crystal-beaded screen. Brings out *full* values of black & white and color pictures. Sturdy, portable, "all-in-one" construction, easy operation. Compact, light weight. Sizes, models for every need. ***Sold at less than 1937 prices by all photo dealers throughout the world.***

DA-LITE

FREE BOOKLET!

DA-LITE SCREEN CO., Inc. CHICAGO 39, ILL. Dept. NG11
Without cost or obligation, send illustrated booklet, sizes and prices, helpful screen data.

Name............
Address............
City............ State............

LINGUAPHONE
IS YOUR PASSPORT
To the World

In your own home, alone or in a group, you can now learn to speak any of 29 languages, quickly, easily, correctly, by the world-famous

LINGUAPHONE *Conversational* METHOD

Approved by educators, it has aided thousands to better jobs, cultural enjoyment, broader life. Send for FREE Book.
Approved for Veterans under G. I. Bill of Rights.

LINGUAPHONE INSTITUTE
60 RCA BUILDING, NEW YORK 20, N.Y.

DON'T PULL HAIR FROM NOSE
May Cause Fatal Infection

Use the Hollis KLIPETTE Rotating Scissors

You can cause serious infection by pulling hair from nose. Ordinary scissors are also dangerous and impracticable. No better way to remove hair from nose and ears than with KLIPETTE. Smooth, gentle, safe, efficient. Rounded points can't cut or prick skin.

So Simple! Just turn the end. Surplus hair clipped off gently, safely.

$1 Made from fine Surgical Steel, Chromium plated—also in 24 Kt. Gold Plate in smart leather case at $3.50 (plus 70c Fed. Tax)

Guaranteed to Satisfy or Money Back

HOLLIS CO. • 11 Commerce St., Newark 2, N. J. • Dept. 8-8
Enclosed is $...... for ...... KLIPETTE(S) at $1 (no tax). ...... in gold plate at $3.50 (plus 70c Federal Tax). If not satisfied, I may return the clipper for refund in 10 days.
Name ______ Address ______

Yours only in a Zenith...
these Twin Triumphs in Tone!

1. IN RECORDS...

THE SENSATIONAL COBRA TONE ARM

"The Cobra brings out beautiful tones we've *never* heard in records before," say excited thousands from coast to coast! That's because it's revolutionary—reproduces records on a Radionic Wave. No crystals, no magnets, no needles to change! Magically erases *all* annoying scratch and vibration. Keeps records like new *hundreds* of plays longer, too. And Zenith's Silent-Speed Changer gently, quietly changes 10 and 12 inch records intermixed . . . so fast you enjoy a practically *continuous* flow of music. No other radio—at any price—gives you this sensational *new way* to play records!

* * *

Shown above, radio-phonograph console in rich mahogany finish. Cobra Tone Arm; New Intermixer type Record Changer—handles 10 and 12 in. records together; Standard Broadcast; Genuine Zenith-Armstrong FM. Model 9H088R **$329.50***

*Your choice of 43 Zenith radios, radio-phonographs and portables from $26.95 to $430. * West Coast prices slightly higher.*

2. IN RADIO...

GENUINE ZENITH-ARMSTRONG STATIC FREE FM

It's the *genuine* FM, invented by Armstrong, perfected by Zenith with FM aerial built-in! Gives glorious new static-free fidelity and other advantages impossible with imitation FM radios. Receives on *both* FM bands—your protection against any future change in FM wave lengths. Plus Zenith's famous Radiorgan . . . tone perfection for your favorite regular radio programs, and—in many models—world-wide short wave, too. Compare—and you'll see that Zenith gives more quality per dollar in *every* way! Get a thrilling demonstration at your radio dealer's show room today.

ZENITH
•LONG DISTANCE• **RADIO**

30 YEARS OF "KNOW-HOW" IN RADIONICS EXCLUSIVELY

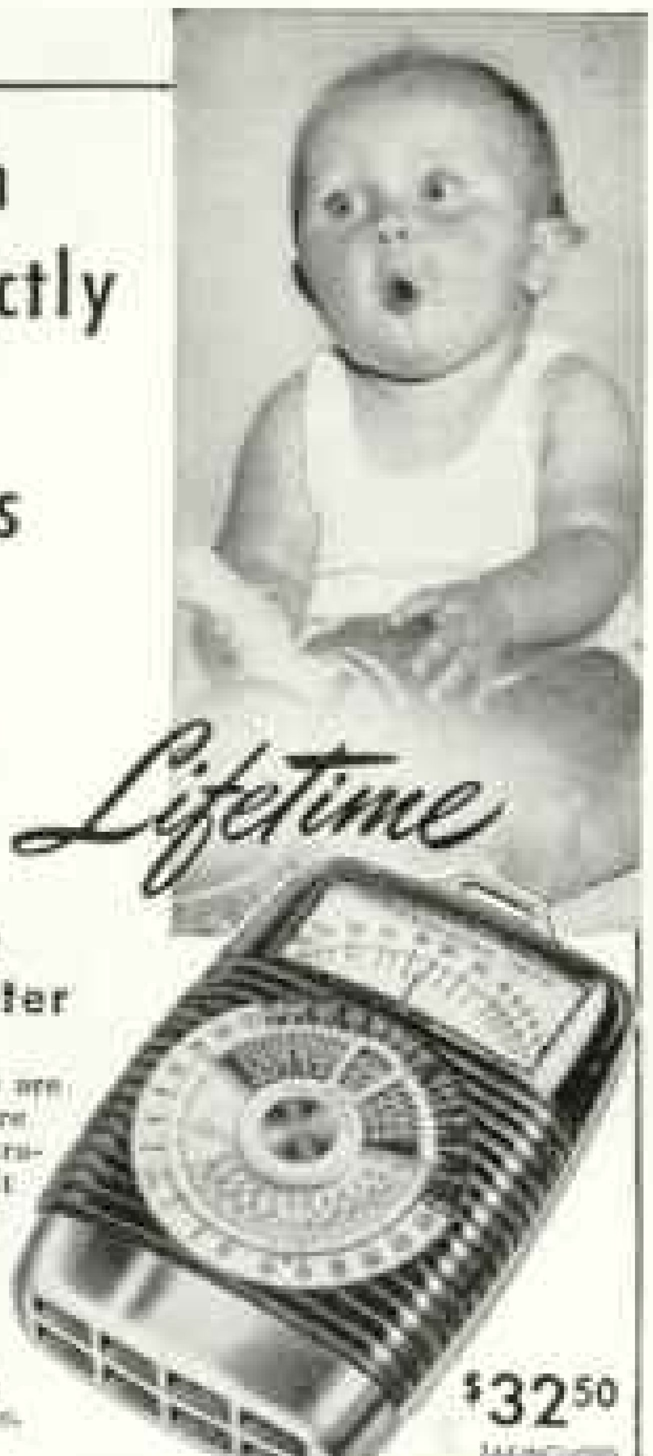
ZENITH RADIO CORPORATION, CHICAGO 39, ILLINOIS

be certain
of perfectly
exposed
photos

with a new

DeJUR *Lifetime*

dual purpose
exposure meter



Clear, sharp negatives are easy when exposures are read with this new, ultra-sensitive light meter. It automatically records incident or reflected light and affords higher scale readings at lower light levels. *Guaranteed for a lifetime of accurate service.*

$\$32^{50}$

pats. pend.

DeJUR-AMSCO CORPORATION ... LONG ISLAND CITY ... NEW YORK

SAFETY

*Guard
Travel Cash
with
American Express
Travelers Cheques*

- Safer than cash. Good till used.
- Promptly refunded if lost.
- Spendable everywhere—backed by American Express, headquarters for World-Wide Travel.
- No identification needed except your signature.
- Cost only 75¢ per $100.
- SOLD AT BANKS, principal Railway Express and Western Union Offices.

Tune in
VOX POP
Wed.
8:30 P.M.
EST

AMERICAN EXPRESS
Travelers Cheques
—most readily accepted
—most widely known

GOOD NEWS!
TWO NEW ALL-IN-ONE
HEARING AIDS
BY *Western Electric*

COMPACT MODEL 65

For the majority of the hard of hearing. New comfort, new convenience. Weighs only 6 oz. Costs less than 1¢ an hour to operate!

NEW SUPER 66

For severe hearing loss. Tremendous amplification, superb quality.

DESIGNED BY FAMOUS BELL TELEPHONE LABORATORIES

··· FREE BOOKS! ··· MAIL COUPON! ···

Western Electric Dept. 380-N11
195 Broadway, New York 7, N. Y.

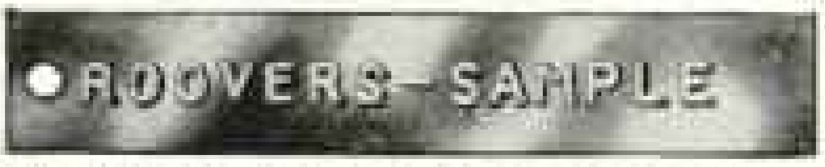
Send me a free illustrated booklet about two new *all-in-one* Western Electric Hearing Aids. Include free copy of "Modern Science and Your Hearing."

Name____________________________

Address__________________________

City________________Zone_____State_______

Distributed in Canada through Northern Electric Co., Ltd.



MAKE YOUR OWN METAL
GARDEN MARKERS

ROOVERS Label Embosser is the first practical lifetime device for making indestructible metal labels for all plants, shrubs, trees, etc. NEW PATENTED SELF-CONTAINED HOLE-PUNCHING DEVICE makes this metal marker indispensable to nurserymen, florists, growers. Tells instantly what is growing where. Great fun to spell out the label and EMBOSS, with easy pressure, in beautiful raised letters on spray-and-acid-proof metal. Any desired wording or length. Great for marking equipment, tools, etc. Not a "gadget," but a real indispensable tool to put your garden on parade. Complete with instructive circular, $33, postpaid in U. S. and Canada, plus 10% U. S. Excise Tax. $2 extra for Special gift box. Money-back guarantee.

ROOVERS JOSEPH M. LOTSCH
PRESIDENT
1427 37th Street, Brooklyn 18, N. Y.

Treat Yourself to . . .
Sitting Comfort

For real sitting comfort, plus postural aid to physical fitness . . . try the new Do/More posture chair for executives. Send now for name of nearest dealer, and our FREE booklet, "Physical Fitness."

DOMORE CHAIR COMPANY, INC.
DEPT. 1117, ELKHART, INDIANA

DO/MORE
Seating Service

Preferred by
EXECUTIVES

Watch them Puff Smoke!
Hear them Whistle!
to See and Hear

the New LIONEL TRAINS Send for the catalog and Sound Effects Record!

The catalog is a beauty!—Full color! 32 Pages of all the newest LIONEL Trains and accessories, with complete story of SMOKE, WHISTLE and Electronic Control.

And so that you can HEAR LIONEL Trains in action and thrill to the exciting WHISTLE we have provided a 4-inch sound effects record, narrated by Bill Stern, famous Sports Commentator, with official R.R. whistle signals on reverse side.

Now you can SEE the New LIONEL Trains, and then put the record on and HEAR them in action! It's a grand package, especially made up for you this year by LIONEL! Send for it now!

An Ideal LIONEL MODEL LAYOUT 1947
LIONEL
NEL R. R. GUIDE
WOO-
WOO-O-O
FUN
LIONEL

SPECIAL OFFER—

HEAR THEM

Not alone can you SEE LIONEL Trains in the catalog, but you can HEAR them in action.

For 25c we'll send you the 32-page full color catalog, the sound effects record with narration by Bill Stern, famous Sports Commentator, also a 32-page "FUN With LIONEL" book, a R.R. Guide Wall Chart, and an ideal layout Blue Print.

LIONEL TRAINS

LIONEL TRAINS Box No. 474,
Madison Square Station, New York 10, New York

Please send me offer checked below. Complete special offer of Catalog, Sound Effects Record, Fun Book, Wall Chart, and Ideal Layout—all for 25c.

☐ I enclose 25c for Special Offer.

☐ I enclose 10c for catalog only.

NAME______________________________

ADDRESS____________________________

CITY____________ZONE______STATE______

91% are

S.V.E. PROJECTORS

Of all still projectors in schools and churches, 91% are S.V.E. projectors . . . unsurpassed for their efficiency, dependability, sturdiness, and ease of operation. There is no optical system more efficient than the S.V.E.

The famous Tri-Purpose Model DD, illustrated above, shows all three: 2" x 2" slides, single- and double-frame filmstrips. 150 watts. 5" focal length coated Anastigmat projection (F:3.5) lens.

FREE ON REQUEST: New slide and filmstrip catalogs on Arts, Sciences, and Social Studies. Also, get S.V.E. projector catalog. *Just added to famous S.V.E. library:* new Kodachrome Visualized Units, each consisting of ten or more color slides with guide. Ask for circular. See your dealer or write S.V.E. direct. Address Dept. G.E.

Again available: S.V.E. Slide Binders

SOCIETY FOR VISUAL EDUCATION, INC.
A Business Corporation
100 EAST OHIO STREET CHICAGO 11, ILLINOIS

MEN—and Women, too!

EXEROW

for YOUR HEALTH and FIGURE

DIRECT FACTORY PRICE*

RIDE and ROW THE BATTLE CREEK WAY!

Enjoy most efficient health-building rowing AND riding! Natural HYDRAULIC pull of rowing plus benefits of horseback riding—adjusts for mild exercise or strenuous workout as you wish. Rhythmic movement of handles, seat and pedals "symmetrizes" and beautifies entire figure. EXEROW safely normalizes WEIGHT—improves HEALTH and appearance. Direct factory price. Write for information TODAY.

Battle Creek EQUIPMENT CO., J-117
Battle Creek, Mich.

*PRICE GUARANTEED to Dec. 15 ONLY

NATIONAL GEOGRAPHIC SOCIETY

MAPS

ARE THE KEYS TO TODAY'S NEWS

BECAUSE The Society's spelling is followed by major press associations, all place names in news dispatches are easily found on these large-scale, *ten-color* charts. Use the order blank below to complete your set of up-to-date maps—ideal for home, school, library, and office use in following and understanding the swiftly moving events of the postwar world. • MAP INDEXES, available for maps marked with an asterisk (*) in the order blank, make easy the location of place names appearing on corresponding maps and describe the areas covered. • MAP FILE: Bound like a book, 7¾ x 10¾ inches, the 10 pockets of this file will hold 20 *folded paper* maps or 10 *paper* maps with indexes.

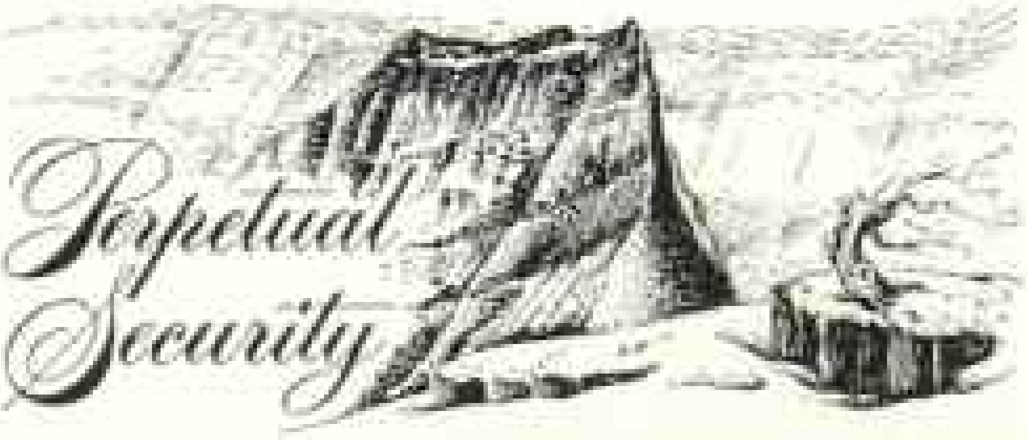
National Geographic Society
Dept. D-T, Washington 6, D. C. ____________1947
Please send me items indicated below:

● Standard size maps come on either paper or linen. *Indexes are available for Maps marked with asterisk*. All items are sent postage prepaid.	How Many Copies Desired		
	Paper Maps 50c each in U.S. & Poss. Elsewhere 75c each	Linen Maps $1 each in U.S. & Poss. Elsewhere $1.25 each	Indexes 25c each in U.S. & Poss. Elsewhere 50c each
Africa*			
Arctic Regions			x
Asia and Adjacent Areas*			
Atlantic Ocean			x
Bible Lands*			
British Isles			x
Canada, Alaska, Greenland*			
China*			
Classical Lands of Medit.*		x	
Countries of the Caribbean* (Mex., Cen. Am., & West Indies)			
E. & W. Hemispheres			x
Europe & Mediterranean* (Boundaries Jan. 1, 1938.)	x		
Europe and Near East* (Boundaries Sept. 1, 1939.)			
Europe and Near East (Shows partition Poland 1940.)	x		x
Central Europe & Medit.*			
Theater of War in Europe, Africa, & Western Asia*			
Germany & Approaches*			
India & Burma*			
Indian Ocean			x
Japan & Adjacent Regions of Asia & Pacific Ocean*			
Japan & Korea in detail*			
North America*			
No. & So. Hemispheres*			
Pacific & Bay of Bengal*			
Pacific Ocean* (With 21 Island Insets.)			
Philippines*			
South America*		x	
Southeast Asia*			
The World*			
U.S.S.R. (Russia)*			
United States—1940*			
United States—1946*			
Northeast United States*			
Northwest United States		x	x
Southeast United States*			
Southwest United States			x

x in columns above indicates item is NOT available. Paper maps are folded for convenient filing. Linen maps come rolled.

Also ... copies of Map File @ $2.50 in U.S. & Poss.; elsewhere, $2.75.

I enclose remittance of $.......... payable in U. S. funds.
(WRITE NAME AND ADDRESS IN MARGIN BELOW)



HUBBARD CASKETS
of
STAINLESS STEEL

Created of durable Stainless Steel, Hubbard Caskets provide permanent security against all destructive elements of time.

Featured by leading Funeral Directors everywhere.

HUBBARD CASKET COMPANY
San Diego, California
Pioneer Manufacturer of Stainless Steel Caskets

WORLD'S Greatest Roller Skates

CHICAGO FLYING SCOUT
Roller Skates

No. 101
Triple-Tread, "Triple-Ware" Steel Wheels

For those who want the best, it's "CHICAGO"—the greatest name on Roller Skates. Equipped with TRIPLE-TREAD, "TRIPLE-WARE" Steel Wheels for endurance and long wear. Perfect Ball Bearings assure smooth running with greatest SPEED. Rubber Cushioned Shock Absorbers remove the discomforts of rough spots, making them safe for the youngest child. "CHICAGOS" are the Choice of Champions. If you cannot obtain them now—it will pay you to wait. See your Dealer TODAY!

CHICAGO ROLLER SKATE CO.
World's Greatest Roller Skates for over 45 years
4408 W. Lake St., Chicago 24, Ill.

SHEPARD Home LIFT

THE AUTOMATIC ELECTRIC RESIDENCE ELEVATOR

Operates from Light Circuit

Safe—dependable. Moderate price—inexpensive to operate. Easily installed in new or old homes. Extensively used throughout the nation.

The Home-LIFT is designed by experts who have been building commercial passenger elevators for years. Send for descriptive literature.

Representatives in Principal Cities

THE SHEPARD ELEVATOR CO.
Builders of Finest Office and Hospital Elevators
2432 COLERAIN AVENUE CINCINNATI 14, OHIO

NOW . . . PLAYING CARDS
featuring the works of
Dale Nichols

AND PAINTINGS BY OTHER FAMOUS AMERICAN ARTISTS

"The Cows Come Home" and "The Three Hunters" by Dale Nichols

American Artists Playing Cards bring you the very texture of enduring works of Art . . . imbued with living hues of the present, nostalgic with glowing embers of the past. The cherished paintings of Dale Nichols and other leading American Artists, faithfully reproduced on playing cards, will richly enhance the pleasure of your leisure moments. You'll find American Artists Playing Cards at the better book and gift shops, stationers and department stores.

American Artists
PLAYING CARDS
offered at these fine stores

Marshall Field & Co., Chicago • J. L. Hudson Co., Detroit • Joseph Horne Co., Pittsburgh • Frederick & Nelson, Seattle • Rich's, Atlanta • Grable's Gift & Art Galleries, Oak Park, Ill. • Warwick Gift Shop, Columbus, Ohio • Bullock's Wilshire, Los Angeles . . . and other stores.

WESTERN PLAYING CARD COMPANY
RACINE, WISCONSIN
The Makers of Guild Playing Cards

25-Year Club—

. . . folks who have been doing a good job for a long time! And Inkograph's right up among 'em! Been working for 33 years, is hard to wear out! Inkograph's point is like a pencil's—one-piece, rounded, cylindrical, made of extra hard 14kt. gold—can't bend or spread. Writes easily on any kind of paper. Fits any hand or writing style. Makes carbon copies, rules lines. In five smart colors, and black. At all good stores And . . .

only **$2**

INKOGRAPH

Inkograph Co., Inc., 200 Hudson St.,
New York City 13, N. Y.

BEAUTIFUL
Raised-Letter
STATIONERY

Make your own

With the ROOVERS Steel-Die Embosser your name and address, monogram or initial is quickly impressed in distinguished raised letters on your favorite note paper and envelopes. Far more beautiful than printing and costs much less. Will not cut paper. Personal embosser, lifetime guarantee.

$3.10 POST PAID UP **NOTARY, CORPORATE AND LODGE SEALS, $4.25 UP**

One-line embosser, $3.10; 2-lines, $3.50; 3-lines, $4.10; 4-lines, $4.50; (Old English type excepted). FREE style sheet shows lettering, initial, seal designs for hand, desk models. *Prompt Delivery.* Sold also by stationers, department stores.

ROOVERS JOSEPH M. LOTSCH, Pres.
1425 37th Street, Brooklyn 18, N. Y.

IT GROWS
With Your Books

Add to this bookcase upwards or sideways as your library grows, or as wall space and harmonious furnishing require. Finest wood craftsmanship. The Globe-Wernicke Co., Norwood, Cincinnati 12, Ohio.

Globe-Wernicke
SECTIONAL BOOKCASES

*DUES: Annual membership in United States, $4.00; Canada, $5.00; abroad, $5.00. Life membership, $100 U. S. funds. Remittances should be payable to National Geographic Society. Remittances from outside of continental United States and Canada should be made by New York draft or international money order.

RECOMMENDATION FOR MEMBERSHIP

IN THE

NATIONAL GEOGRAPHIC SOCIETY

** The Membership Dues, Which Are for the Calendar Year, Include Subscription to the National Geographic Magazine*

PLEASE FILL IN BLANK BELOW, DETACH, AND MAIL TO THE SECRETARY

....1947

To the Secretary, National Geographic Society,
Sixteenth and M Streets Northwest, Washington 6, D. C.:

I nominate..

Occupation..
(This information is important for the records)

Address..

....*for membership in The Society.*

....

....
Name and Address of Nominating Member

11-47

THE ONLY GENUINE WEBSTER IS THE

Merriam-WEBSTER

WEBSTER'S
NEW INTERNATIONAL
DICTIONARY
Second Edition

A century ago, G. & C. Merriam Company acquired the rights to publish Webster's Dictionary. Through the years, with each new edition, Merriam has constantly enlarged the scope and usefulness of Noah Webster's original work, until today the names MERRIAM and WEBSTER are equally important in identifying "The Supreme Authority." Ask for WEBSTER'S NEW INTERNATIONAL DICTIONARY, *Second Edition*—the great unabridged Merriam-Webster.

G. & C. MERRIAM CO., Springfield 2, Mass.

1847 A CENTURY OF PUBLISHING MERRIAM-WEBSTERS 1947

"THE SUPREME AUTHORITY"

HOW WELL DO YOU— HEAR?

Do you miss things you should hear? Do voices sometimes sound indistinct at parties, church and home? Try....

PARAVOX 'XTRA THIN

ONE-CASE • ONE-CORD

HEARING AID

Pat. No. [illegible]

Wt., 6 oz.
Shorter Than a Pen

Brings to your ear, clearly, increased volume of sounds. Dealers almost everywhere. Serviced in one minute. Up to 75% saving on "A" batteries. One year guarantee. Send for facts.

Accepted by the Council on Physical Medicine, American Medical Association.

BOOKLETS mailed to you in plain envelope FREE

PARAPHONE HEARING AID, INC.
2011B E. 4th St., CLEVELAND 15, OHIO

Write Today

★ FOR THOSE WHO CANNOT OR SHOULD NOT CLIMB STAIRS

Sedgwick

Stair strain *is* heart strain. Safeguard your health. Don't climb. *Ride* upstairs on a Sedgwick. Electric or hand power. Easily and quickly installed. Moderate cost. Doctors recommend.

Write for illustrated booklet

SEDGWICK MACHINE WORKS, 137 W. 15 ST., NEW YORK

ELEVATORS AND STAIR-TRAVELORS

See New Mexico
THE LAND OF ENCHANTMENT

Here are the strange contrasts of towering mountains and sweeping mesas, and deep underground the majestic handiwork of Nature at Carlsbad Caverns National Park fills you with a sense of awe and reverence.

In rugged canyons you will find ruined cities which thrived before the Spaniards came, in secluded **pueblos** colorful ceremonial dances and chanting Indian voices remind you of the strangeness of pagan worship.

No less fascinating are villages where the spirit of the **Conquistadores** still lingers and Spanish is spoken by natives who follow ancient customs, and celebrate Feast Days with gay **bailes** and **fiestas.**

You can be as active or as lazy as you choose. You can ride mountain trails through great forests, enjoy golf, tennis, skiing, or just loaf away the days in brilliant sunshine from a turquoise sky.

Our maps and free booklet, "The Land of Enchantment," will tell you more about New Mexico. Mail the coupon and we'll send them, pronto. . .

NEW MEXICO STATE TOURIST BUREAU

Room 1051, State Capitol, Santa Fe, New Mexico

Please send free: ☐ New booklet, "Land of Enchantment," ☐ New "Recreational Map of New Mexico."

NAME ....

STREET ....

CITY .... ZONE ...... STATE ....

© 1947, New Mex. State Tour. Bureau, Santa Fe, N. M.

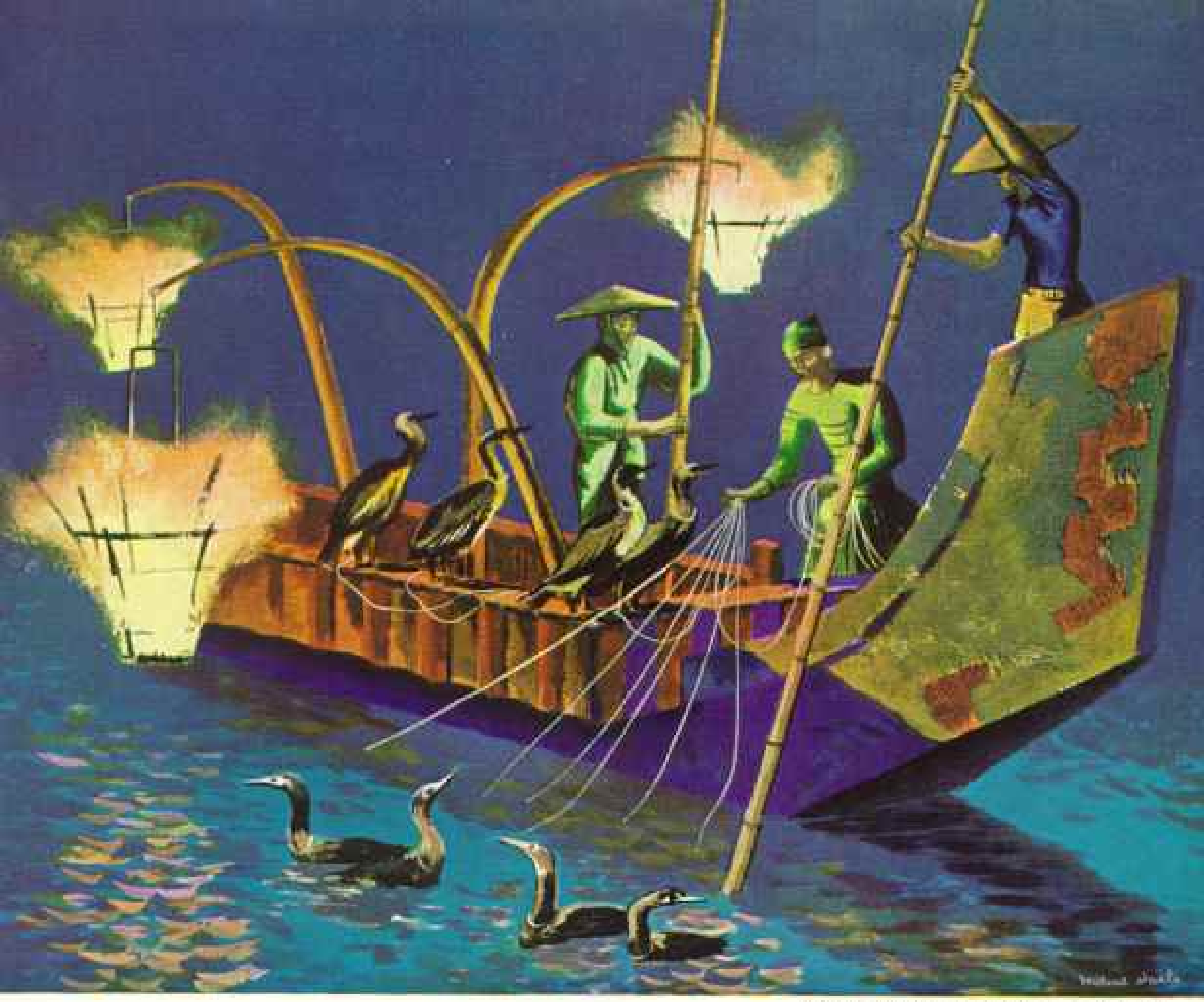
"Weavers of Speech"

To you, who each day
Take on anew your tasks
Along the lines that speech will go
Through city streets or far out
Upon some mountainside
Where you have blazed a trail
And kept it clear;
To you there comes from all who use the wires
A tribute for a job well done.

For these are not just still and idle strands
That stretch across a country vast and wide
But bearers
Of life's friendly words
And messages of high import
To people everywhere.

Not spectacular, your usual day,
Not in the headlines
Except they be of fire, or storm, or flood.
Then a grateful nation
Knows the full measure of your skill and worth,
And the fine spirit of service
Which puts truth and purpose
In this honored creed—
"The message must get through."

BELL TELEPHONE SYSTEM



Night fishing with Cormorants, an ancient, colorful custom in the Orient

Sailing soon to the ORIENT – two new "vacation ships"!

The old-time glamour of the Orient again begins to unfold. And we are ready—ready to announce new luxury for the "world's supreme travel experience."

Proudly, we present the magnificent new liners President Cleveland and President Wilson. Each so richly equipped, it is, in fact, a "vacation ship" sailing under the American Flag. Let us tell you more about these new ships—and about the Orient as it is today.

AMERICAN PRESIDENT LINES

ASK NOW ABOUT TRANS-PACIFIC-ORIENT "VACATION SHIP" CRUISES!

To Honolulu, Shanghai, Hong Kong, Manila and return—47 days—$1,081 and up, 1st class

This may be for you—that long-anticipated cruise to the Orient and return. Forty-seven holidays in a row. Days to rest and relax. Time to have fun. Inquire now about this trip of trips.

At sea or in port your ship is your hotel. Your shipside apartment is air-conditioned—with a private bath and phone. Superb cuisine. Movies. Games. Library. Shops. *And*—a matchless trip!

Shore excursions in the Orient are subject to local conditions and to approval by proper authorities. Cost is "extra." But cruise schedules allow time for excursions wherever permitted.

PORTS OF CALL: *Normal 'Round-the-World service to:* (Boston) • New York • Havana • Cristobal • Balboa • Los Angeles • San Francisco • Honolulu • Yokohama • Kobe Shanghai • Hong Kong • Manila • Singapore • Penang • Colombo • Bombay • Suez • Port Said • Alexandria • Naples • Genoa • Marseille • (New York)

Offices: New York, N. Y. • Boston, Mass. • Washington, D. C. • Cleveland, Ohio • Chicago, Illinois • Seattle, Wash. • Los Angeles, California • San Francisco, California (Head Office)